Marital risk factors and HIV infection among women:

A comparison between Ghana and Kenya

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This dissertation is dedicated to the women of Africa, who live with the hope that it shall be better each day.

ABSTRACT

The purpose of this study is to establish and compare marital risk factors associated with HIV infection among women in Ghana and Kenya, regions representing low and high HIV prevalence, respectively. The study controls for individual demographics, sexual behavior, and socio-cultural contexts. Samples of 2,057 in Ghana and 1,657 in Kenya are drawn from Demographic Health Surveys of 2003. Of married/ cohabiting women, about 3% and 8% are infected with HIV in Ghana and Kenya respectively. These mirror the general population prevalence in both countries. Results of logistic regression analyses indicate that when individual demographics including SES, degree of autonomy to make self-healthcare decisions, religious affiliation, sexual behavior, and socio-cultural factors are controlled for, marital characteristics significantly account for HIV infection. For Ghana, the model accounts for 7% of variance and remarriage is the only significant marital risk, increasing the odds of infection 1.9 times over those who are not remarried. For Kenya, marital factors explain one-half (6%) of the 12% total variability accounted for by the model. Remarriage, polygyny, and traditional marriage are the positive risk factors, with estimated increased risk likelihood of 2.8, 2.4, and 2.2 respectively. Negative predictors include delayed sexual debut and marriage and longer duration of marriage. The latter is a significant predictor in Kenya. Implications for educators are including content stating the life course risk factors, beginning with early sexual debut, delayed marriage, and ending up in a marriage that is likely to be characterized by multiple occurrences of consensual unprotected sex. Such unions include traditional/ cohabitation, polygyny, and/or remarriage. Additionally, public health and social policies that delay sexual debut, marriage, and reduce the risk of infection both

before and after marriage should be put in place. Risk-reduction policy is a public health approach that provides options for safe sex for young people who might be engaging in sex. Social policies include laws that govern social life, such as marriage. Both countries need to outlaw early marriage and enforce laws against it. The challenges of multiple partner marriages like polygyny and remarriage, which are protected by human rights laws, can be addressed through continued dialogue in communities to adopt risk-reduction strategies in such unions. Other factors that support such practices, like poverty, require long-term plans. These should be relentlessly pursued.

Further research with valid measurements for empowerment and socio-cultural factors that are relevant to HIV infection is needed. Similarly, research on long-term marriages that have weathered the HIV era could provide insights for strengthening marriages through education.

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CHAPTER ONE

Introduction

Sub-Saharan Africa is the epicenter of the HIV/AIDS epidemic. Within this region, women constitute 61% of adults living with HIV (The Joint United Nations Programme on HIV/AIDS [UNAIDS] & The World Health Organization [WHO], 2007), but research that focuses on them is limited. Specifically, empirical research on socio-cultural risk factors associated with HIV/AIDS infection among married women in the region is limited and inconclusive (Akinyemiju, 2006). These factors are poorly understood and are further complicated by women's enhanced susceptibility to infection due to their physiology, which exposes them to more of the bodily fluids exchanged during intercourse than men. The complexities make it challenging to determine the risks associated with HIV infection among married women. Yet, the identification of these factors would be useful to inform educators, practice, and/or policy.

The limitations in research are mostly due to the following two reasons: limited availability of data and research agendas that are often donor-driven. The former has led to the use of samples selected from eclectic, diverse populations of women (Akinyemiju, 2006), yielding contradictory results. Clark (2004) found that early marriage for women in a region with high prevalence of HIV increases the risk of infection four times over that of their single sexually active counterparts in Kenya. In contrast, after establishing that early initiation of sex followed by a time lapse before marriage is even more detrimental in increasing the odds of infection among women, Bongaarts (2006) coined the term-*delayed marriage* to express the effects of premarital sex.

Secondly, both factors have led sexual behavior to be conceptualized in U.S.-terms and detached from culture (Parker, 2001). Consequently, HIV infection risk factors that are associated with culture are less likely to be examined and interventions for risk-reduction fail to consider the cultural meanings of sexual behavior, resulting in minimal impact on communities (Muturi, 2005). HIV/AIDS transmission in sub-Saharan Africa is generally through heterosexual contact, where men report higher rates of risky behavior than women do. This has led donors to focus on risks of HIV infection among men more than among women (e.g., Nii-Amoo Dodoo & Ampofo, 2001; Weiss, Quigley & Hayes, 2000). In fact, commercial sex workers are perhaps the only group of women who have so far been identified to be at risk of infection. Married women are considered to be at the least risk of infection. Arguably, marriage at least provides a regular sex partner as opposed to sexual satisfaction from different partners (Bracher, Santow & Watkins, 2003; Maharaj & Cleland, 2004 and Clark, 2004).

This notion that marriage is a safety net has prevailed despite evidence to the contrary. Examples of such evidence calling this safety net theory into question include the large number of orphans now estimated at 15 million in sub-Saharan Africa (UNAIDS & WHO, 2006); reports of maternal HIV-related deaths (Ramogale, Moodley & Sebitloane, 2007; Rogo, Oucho & Mwalali, 2006); and indirect causes of HIV maternal death through other diseases like cervical cancer (*Science Daily*, 2007). The latter is found prevalent among women receiving HIV treatment. These trends suggest a need to focus on socio-cultural risk factors associated with HIV infection among married women. Factors including relational marital characteristics such as living arrangements for couples, differences in age and education, age at first marriage, years in marriage,

participation in extramarital sex, and type of marriage need to be examined to determine their association with HIV infection.

Bakilana (2005) observes the importance of understanding couple relational characteristics as factors that influence HIV infection. In analyzing the age of sexual debut as a risk to HIV infection in South Africa, Bakilana recognizes the weaknesses of seeking individualistic variables and recommended broadening the understanding of sexual relations to include probes for characteristics of sexual partners. This dimension would enrich studies that focus on infection within marriage. The challenge of identifying marital factors associated with HIV infection, however, arises from complexities in the formation and structure of marriages. The dictionary describes marriage as "a state of being united to a person in a consensual and contractual relationship recognized by law and characterized by ceremony" (Merriam-Webster, 2009). The social sciences have recognized the limitations of this dictionary definition, which excludes many forms of marriages specific to different cultures. Nii-Amoo Dodoo (1998) acknowledges these complexities and observes that "marriage, itself, is difficult to capture because it takes place in stages and over a period of time, as opposed to an instant on a given day" (p. 234). However, for convenience, marriages might be classified to reflect religious, legal, and traditional laws that sanction them. The reality is that marriages vary on many fronts.

In Africa, missionaries and colonial rulers introduced religious and "legal" ways of transitioning from singlehood to marriage. The approaches have been incorporated into the traditional customary ways, creating hybrids of marriages. Broadly, two types of marriages may be assumed: traditional and nontraditional. Nontraditional marriages include civil (legal) and religious marriages. A marriage is termed legal when a

government registrar or church minister conducts the ceremony and issues a marriage certificate. Traditional marriages involve ethno-cultural processes such as paying bride price (tokens given to the bride's family by the groom's family) to accomplish the transition from singlehood into marriage. Traditional marriages take many forms, including woman to woman, monogamy (one husband, one wife), and polygyny (one husband, more than one wife). Woman-to-woman marriages are unique traditional arrangements because the woman husband determines the man to father "her" children. Since assisted reproduction is almost non-existent in Kenya, sexual intercourse is the primary mode to conception and this increases risks of HIV infection when the woman husband prefers multiple fathers for her children.

The line between traditional and nontraditional marriages is blurry. The introduction and recognition of central governments and religious groups have influenced the social meaning of marriages in Africa, making them more diverse in both structure/ formation and in the relationships thereafter. It is common to find couples that go through traditional marriage processes, including payment of a bride price, and then hold either a church wedding or a civil ceremony at the registrar of marriage, where they get a certificate. Essentially, such marriages are both traditional and nontraditional. The question remains, what norms guide such relationships? Perhaps the latest evolution in marriage is the introduction of the common law or trial marriages. These often begin with cohabitation, where couples live together in a relationship lacking both traditional and nontraditional commitment. Some cohabitants progress into a marriage through a civil, religious, or traditional ceremony. In some cases, cohabitation does not progress into marriage. Despite the complex pathways to marriage, researchers tend to dichotomize

marriage into monogamy and polygyny rather than considering the whole range of relational characteristics and socio- cultural contexts that give meaning to and influence marital relationships and outcomes, including couple HIV status.

Marriage is so fluid that research has remained inconclusive on the role it plays in HIV infection. Nii-Amoo Dodoo (1998) explains this in the following statement, "…even monogamous unions in the region [Africa] could become and, therefore, remain potentially polygamous" (p. 234). Regarding polygyny, for example, Nwoye (2007) differentiates affluent polygyny from interventive polygyny, which is a response to family stress such as childlessness resulting from infertility or children of only one gender. The relational aspects of marriages as described by couple characteristics may be a good beginning to understand the role of marriage in connection with HIV infection. Marital characteristics provide parameters that can be used to determine whether a woman becomes infected with HIV or not. The dearth of information on the risks of HIV infection in marriage led a newlywed East African woman to state, "There are no billboards, radio spots or TV ads addressing married people…" [Integrated Regional Information Network (IRIN), 2009]. This is despite the fact that marriage is viewed as a legal contract within both traditional and nontraditional paradigms. Besides, more than half of the female population age 15 years and above are married [Central Bureau of Statistics (CBS), 2004], making marriage a dominant context within which women live. It is also imperative to recognize that the sexual journeys of women differ over their life course.

The need to determine marital risk factors associated with HIV infection is further underscored by the gaps identified when policies and practice are evaluated. Policies in

education, public health, and recently criminal justice (in Kenya) have been formulated to reduce the risk of infection. Education through mass media has probably been the most widely used means of intervention. At the onset of the epidemic, education was referred to as awareness creation. With western influence, the ABC model was developed to categorize levels of risk from the public health/ educators' perspective. **A** stands for abstinence, targets youth, assumed not to have initiated sex and encouraged to remain celibate until marriage. **B** stands for being faithful, which is suitable for married individuals who are encouraged to be faithful to one another. **C** stands for condom use, directed at high-risk groups like commercial sex workers.

Although the model is credited for the success seen in Uganda, it has been criticized for categorizing individuals into risk groups that are not necessarily applicable to Africa, in contrast to the U.S., where HIV continues to be confined to specific populations (Green, 2004). Additionally, Muturi (2005) finds that preventive education through mass media fails to address socio-cultural aspects of sexual behavior, leaving individuals to use sexual myths and fallacies created in fear to inform their sex lives and guide them. For example, participants in the study reported practicing shared healing, where a spouse has sex with a partner while on medication for a sexually transmitted infection so that they can both heal. Earlier, Witte, Cameron, Lapinski & Nzyuko (1998) also reports a mismatch between preventive messages and the realities of targeted groups. The information is found to be too basic to tackle the complex issues that individuals grapple with to avoid infection. For example, the target population needs information about how to negotiate for condom use rather than how to use them properly.

Regarding judicial involvement with HIV, Kenya has instituted two separate but related laws that criminalize HIV infection in marriage: The Kenya Sexual Offense Act and the HIV and AIDS Prevention and Control Act both became law in 2006. The Prevention Act places responsibility and institutes punishment on infected individuals who transmit HIV to their partners so long as the plaintiff can prove failure to take necessary preventive measures. Opponents have criticized the Sexual Offence Act for emphasizing sexual assault transmission, which is unlikely in marriage. In fact, sex within marriage is more likely to be consensual and unprotected—phenomena that would not amount to criminal actions. They have also criticized the Preventive Act for its potential to be counterproductive to testing for HIV and increase mistrust in marriages. If test results and knowing one's HIV positive status can lead people to the justice system, few will be motivated to undertake this crucial step toward prevention. At the same time, proving HIV infection by a marriage partner would be burdensome.

It is imperative to formulate social policies emanating from research to augment existing policies and practices. Educators need more accurate, targeted information about specific groups to respond to some of the gaps identified. This study aims to provide insight to understand HIV infection among married women by delving into specific dimensions of marriage and addressing some of the gaps identified. Results from this study should be useful in guiding practice through education and formulation of social policies to prevent infection within marriage.

The purpose of using the Demographic Health Survey data of 2003 is to: 1) identify *individual demographics*, 2) determine sexual behavior that includes *age at sexual debut* and *delayed marriage*, 3) describe the socio-cultural context of marriage,

and 4) determine *marital risks* as factors that are associated with HIV infection for married women in both Ghana and Kenya. These two countries are selected to represent regions of low and high prevalence of HIV respectively.

Statement of the problem

The lenses through which HIV/AIDS infection have been viewed are geopolitical and behavioral (Green, 2004). The meta theories have kept the perspectives of HIV/AIDS less relational, as the geography of politics (war), disease, poverty, and culture have been used to color the map of HIV infection in Africa (United Nations, 2005). Behavioral approaches have focused on perception of risks (e.g., Maharaj, 2004; Akwara, Madise & Hinde, 2003); descriptive studies identify who is infected (e.g., Nilses, Lindmark, Munjanja & Nystrom, 2000; country-specific Demographic Health Survey reports); and simulations model demographics and behavior, including outcome and cohort studies (e.g., Bracher et al., 2003). Marital status has at times been used as a variable, often to determine differences in strengths of association between marital statuses and risk of HIV/AIDS infection. Results show that married women have reduced risks of infection compared to others. Although being married is different from not being married, marital characteristics have remained unexamined. Instead, individualized prevention packages are used. For example, safer sex promoted through social marketing of condoms to commercial sex workers but not to married women, even when they report a lack of trust in the sexual fidelity of their spouses and/or are in multiple-partner marriages. This begs for asking questions to establish whether there are any associations between marital characteristics and HIV infection. Different marital types, couple relational

characteristics, sexual behavior, and contexts over the life-span ought to be examined with reference to infection within marriage.

A few studies report contradictory findings on whether the risk of infection is more likely to occur within marriage (e.g., Clark, 2004; Ghana Statistical Services [GSS], 2004) or before marriage (e.g. Bongaarts, 2006; Glynn, et al., 2001; IRIN, 2007). In Clark's model, demographic characteristics of hypothetical husbands for the women studied are used. Consequently, reasons for increased risks of HIV infection due to early marriage are deduced. The afore mentioned studies support findings with compelling arguments befitting the distinct populations studied, the debate remains inconclusive, as they are not only contradictory, but also mutually exclusive.

Nationally representative data that could be analyzed to increase understanding of HIV infection per se without using sexual behavior and perception of risks as proxies has been lacking. Prior to the Demographic Health Surveys (DHS) of 2003 conducted in Tanzania, Kenya, Ghana, Burkina Faso, and Cameroon, individual-level data from nationally representative samples, including results of HIV tests, were unavailable (de Walque, 2006). Under this limitation, researchers used sexual behavior as a proxy risk indicator for HIV infection. The 2003 DHS, therefore, enables researchers to test associations between HIV status against a wide range of independent variables besides sexual behavior and individualized demographic characteristics. This study takes advantage of the extra quality of the HIV test results included in the data to determine marital risk factors associated with HIV infection among women.

Rationale

Findings would be useful to further social policies on marriage that safeguard women from HIV infection. When women are safe from infection, families and especially children benefit from what the United Nations Children's Fund refers to as a 'double dividend' (UNICEF, 2006). Its report argues that children are affected by the circumstances of their mothers: children of uninfected mothers are safe from vertical transmission of the virus. In addition, knowledge generated could be used to educate the public about risks and benefits associated with marriage. Prevention within marriage would be separated from generalized approaches that have been less effective than desired (Muturi, 2005; Witte, et al., 1998).

Purpose

The purpose of this study is to determine marital risk factors associated with HIV infection when controlling for individual demographics, sexual behavior, and socio-cultural contexts. It also seeks to compare the strengths and directions of association between the four groups of variables. Individual demographics include SES, individual degrees of autonomy to make self-healthcare decisions, and religious affiliation. Sexual behavior measured by age at sexual debut and delayed marriage. Socio-cultural context was determined by area of residence, either rural or urban, as well as whether or not the community practices female circumcision. Marital characteristics include number of unions (remarriage), type of marriage, presence of husband in the house, number of other wives (polygyny), age at first marriage, years of marriage, extramarital sex, and differences in age and education between spouses. This study will also contribute to an

understanding of the disparities in HIV prevalence observed in the two countries, Ghana and Kenya. The specific objectives are to:

1. determine whether women who opted to test for HIV are different from those who did not;
2. determine whether women infected with HIV are significantly different from those who are not;
3. establish which group or individual variables (individual, relational, and community) account most for HIV infection;
4. compare individual variables' strength and direction of association with HIV infection;
5. establish whether infection risks are greater before or after marriage;
6. establish the difference between delayed marriage and early marriage as predictors of HIV infection;
7. compare findings between Ghana and Kenya.

Conceptual framework

Ecological and life course theories are used in this study. The ecological approach has been used in describing geographical prevalence as well as when associating individual characteristics and population risk factors. For example, UNAIDS mandated the multicenter studies with funding from The World Bank to explain the disparities observed in HIV prevalence in different regions in Africa. These multicenter studies refer to disease burden in the population of interest as an ecological risk factor. The present study therefore applies a modification of Bronfenbrenner's 1979 ecological model that explains the relationship between an individual and the layered systems that form the

environment within which he or she exists. These systems influence outcomes in behavior, conditions, disease, etc. that are observed in individuals. The concepts of micro- and macrosystems help define and categorize variables.

Microsystems. Individual demographics form part of the microsystem. They include socio-economic status (SES), the degree of autonomy to make healthcare decisions for oneself, access to healthcare, and religious affiliation.

Macrosystems. The socio-cultural context, which includes area of residence and whether the community practices female circumcision, are part of the larger system. Female circumcision has been viewed as an indicator of the existence of underlying cultural practices that may not favor women (Yount & Abraham, 2007). For this reason, the present study includes the phenomenon as a variable.

An expanded view of the life course theory beyond the life span construct that described the developmental growth of an individual to include social structure and history as influencing development (Bengston & Allen, 1993), guides the conceptualization of other risk factors associated with HIV infection. Two concepts from the theory, namely time and social context, are used. Social context describes the location of the married woman. Since the concept of social context lends itself to Bronfenbrenner's ecological model, where the individual is an interactive agent, the sexual behavior of the woman before and after marriage are viewed in the same light. Within the historical timeline, turning points such as age at first sex and age at first marriage are compared as events before and after marriage. Being events to which society accords cultural meanings, first sex and first marriage alter roles and have far-reaching implications in life

The woman's location is seen through the type of marriage, whether the husband lives in the same household, and existence of multiple sexual partners through remarriage, polygamy, or extramarital affairs, and the duration of marriage. Other marital characteristics include information on partners and differences in educational attainment between spouses and age. The life course perspective enables the establishment of norms regarding the time of initial sex and marriage.

CHAPTER TWO

Review of Related Literature

HIV/AIDS in Africa

According to the Global Summary of the AIDS Epidemic (UNAIDS & WHO, 2007), sub-Saharan Africa remains the most seriously affected region, as AIDS is still the leading cause of death. Although new infections have dropped from 2.2 million in 2001 to 1.7million in 2006, the region is still home to 68% of the world's adults living with HIV, 90% of infected children, and 76% of deaths attributed to AIDS. There are also great disparities in prevalence, from a low of 2% in the Sahel (Mali, Niger, and Chad) to a high of 15% in southern Africa. The latter accounts for 32% of the world's new infection and AIDS deaths (UNAIDS & WHO, 2007). Within each nation are even more disparities. Consistent with regional disparities in prevalence, women in sub-Saharan Africa account for 61% of adults living with HIV whereas those in the Caribbean account for 43%. Other regions with considerable HIV risks, such as Latin America, Asia, and Eastern Europe, are showing a slow growth of infection among women whom their drug-using sexual partners infect. In the sub-Saharan region, infection is mainly through heterosexual contact. Given these figures, one would imagine that research, prevention, and intervention would focus on women; however, this has not been the case. The Global Coalition on Women and AIDS established only in 2004, almost 30 years after the discovery of the HIV virus, to respond to the increased feminization of the epidemic. The western model of targeting risk group populations has been adopted in Africa, with commercial sex workers (CSWs), long distance truck drivers, and unmarried youth are targeted as risk groups (Green, 2004). Thus far, however, married women have not made

it to the list of risk groups even though they directly and indirectly interact with the so-called risk groups as potential or actual spouses.

HIV/AIDS in Ghana

According to the Population Reference Bureau (2008), Ghana has a population of about 23 million, a growth rate of 1.9, a crude birth rate of 29, and a total fertility rate of 3.8. Life expectancy at birth is 59 years. An estimated 260,000 people live with HIV and the prevalence rate is 1.9. Of the 250,000 adults above 15 living with HIV, 150,000 are women, and the number of orphans due to HIV is 160,000 (UNAIDS, 2008). The report states that Ghana's goal is to reach an ART coverage rate of 65%, from the current 20%, by 2010. Other goals include increasing knowledge about HIV from an estimated 30% to 50%, and prevention of mother to child transmission coverage from 20% to 80%.

The transmission of HIV/AIDS the world over has been associated with risky sexual behavior after relations with international individuals, and Ghana is no exception. According to Agyei-Mensah (2001), the beginning of HIV/AIDS in Ghana could be associated with economic migration into and out of the country. Migration increased prostitution, which accounts for the concentration of HIV infection in the Ashanti and eastern regions of the country. In the 1960s, Ghana had a vibrant economy in cocoa production and was home to many immigrants from neighboring West African countries. When the economy dropped in the 70s, out-migration followed. Certain geographical locations experienced greater numbers of migration, especially of females. Returning female prostitutes accounted for the higher female to male ratio of those infected at the onset of the epidemic in the 80s. Trends of infection—who is infected, when, and how—have dominated the literature. These trends have depicted differentials in age, gender, and

sexual behavior over time. Differences in prevalence by geographical location lend to the injection of cultural nuances. Marital status has been the least considered demographic factor although even nonprofessionals have cited it as a means of justifying risky sexual behavior.

Efforts to track prevalence in Ghana were not instituted until 1990, when the Ministry of Health implemented the National Sentinel Surveillance. Since 1994, an annual HIV sentinel survey is conducted in antenatal clinics and sexually transmitted infection (STI) centers. In 2003, the surveillance consisted of 30 antenatal clinics located strategically in 28 of Ghana's 110 districts and covering all 10 regions. According to the 2003 Ghana Demographic Health Survey (GDHS), only 2% of Ghanaian adults were infected with HIV. The projected adult prevalence rates for Ghana were 6.4% in 2004, 8.2% in 2009, and 9.5% in 2014 (Ghana, 1999b). Contrary to the projection, by 2005, the total prevalence stood at 3.6% and adult prevalence was estimated at 2.3% (UNAIDS & WHO, 2006). There were signs that there could be a decline in prevalence. A progress review carried out in 2007 indicates that Ghana is on track and would achieve its 2010 targets provided it sustains current efforts. There has been a marked increase in ART coverage and prevention of mother-to-child transmission resulting from an exponential increase in service delivery points in both public and private health facilities. Sexual intercourse is the predominant mode of transmission, accounting for about 85% of all infections. Heterosexual intercourse specifically accounts for 75-80% of all infections. Vertical transmission or mother to child accounts for 10-15% and transmission through blood products accounts for about 5%.

In 2003, prevalence in women age 15-49 was almost 3%, while it was less than 2% among males of the same age group. In fact, prevalence among females was consistently higher in all age groups except 40-44, in which male prevalence was higher. The female-male gap was particularly large within the 25-29 age groups, in which women were almost three and a half times more likely to be HIV positive than men were. Among women, those who are married are almost three times more likely to be living with HIV than those who have never been married are (Ghana Statistical Services, 2004; UNAIDS & WHO, 2006). It has been said that one of the significant ways to become infected with HIV is to get married (Asamoah-odei, 1996). This is because condom use is a very contentious issue for couples, even when one partner is promiscuous. Thus, marriage is a risk factor for women in Ghana. Unlike in Kenya, HIV infection in Ghana is prevalent among older persons; for example, the risk age bracket among women in Ghana is 35-39, whereas in Kenya it is 25-29. Married couples and the elderly might be considered marginalized groups because AIDS education has not targeted them (Antwi-Baako, 2000).

The spread of HIV in Ghana challenges previous explanatory models based on cross-cultural generalizations (Agyei-Mensah, 2001). The author summarized theoretical approaches used to study the spread of HIV in Ghana. They include cultural and sexual behavioral models, vulnerability, migration, microeconomics, political ecology, diffusion, and biomedical perspectives. The puzzles of gender differences could be explained by contagious diffusion pattern, which contrasts a pattern in which members of a community travel back to their ethnic enclave and spread the disease in the community explained by the general diffusion theory, in which HIV travels from urban

concentrations to rural areas. Agyei-Mensah identifies female emigration as a piece of the puzzle of HIV in Ghana that the country must address to avoid surpassing the 5% prevalence threshold at which HIV is an epidemic.

HIV in Kenya

According to the Population Reference Bureau (2008), Kenya has a population of about 38 million with a 2.8 growth rate and a total fertility rate of five. Life expectancy is 57. According to UNAIDS (2008), the number of Kenyans living with HIV is estimated to be between 1.6 and 1.9 million and the prevalence rate lies between 7.1 and 8.3%. Adults over 15 living with HIV are between 1.4 and 1.7 million, out of which about 0.9 to 1.1 million are women. The number of orphans due to HIV-related deaths is estimated to be between 1.1 and 1.3 million. Since 1985, the Kenyan government, with the support of the United Nations, bilateral agencies, nongovernmental organizations, community-based organizations, and religious institutions, has made efforts to address HIV/AIDS problems. In 1987, the National AIDS Control Programme (NASCOP) was established with an immediate mandate of creating AIDS awareness, ensuring blood safety, and overseeing clinical management of AIDS control programs. Even though Kenya has experienced a drop in prevalence from 10% in the late 90s to 7% in 2003 (Central Bureau Statistics, 2004), the epidemic is still serious, with 1.3 million currently living with HIV/AIDS. Infection levels among pregnant women has dropped steeply, with some sites falling from 25% in 1998 to 8% in 2004 and others from 15% in 2001 to 4.3% in 2004 (Cheluget et al., 2006).

Comparison: HIV in Ghana and Kenya

A comparison of the epidemiology of HIV/AIDS between Ghana and Kenya reveals some similarities as well as differences. Similarities are evident in the response and management of the disease. Both governments initially lacked political leadership and later made staggered efforts to guide prevention and management of the disease. Ghana's first response was to view the disease as a medical problem and manage it as an individual health issue. A public health approach was introduced as the disease spread. In 1985, Ghana formed the first technical team to advise the government on a short-term plan for HIV prevention and control. In contrast, Kenya established the National AIDS Control Program (NASCOP) within the disease Control Unit of the Ministry of Health for prevention, management, and control of HIV in 1987. The duties of the NASCOP include organizing educational campaigns to inform the public about ways to reduce risks of infection through the mass media, workshops, video shows, etc. Given that the first publicly declared case of HIV positive status in Ghana occurred in 1986, the country acted more quickly than Kenya, who instituted a national board three years after the first case was publicly declared.

Although similarities between the two countries also exist in the names of the institutions formed for policy-making around HIV/AIDS, different political and contextual situations lead to differences in programs. For example, several countries have institutions that they call "National AIDS Control Programme", (NACP), but the activities of this entity differ from country to country. Condom promotion was given some attention under the Ghanaian NACP through joint efforts of Ghana's Ministry of Health, Social Marketing Foundation, and other private nongovernmental organizations.

Facilities for HIV testing through blood and antibody screening arrived in 1987. At the turn of the century, the government of Ghana adopted a multisectoral approach to HIV programming. In September 2000, the Ghana AIDS/STI Commission (GAC) was formed as a supraministerial and multisectoral body to direct and coordinate all HIV/AIDS related activities in the country under the leadership of the president. The priority areas outlined by GAC include preventing new infections, care and support for people living with HIV/AIDS, decentralized implementation and institutional arrangements, research, and monitoring and evaluation (GAC, 2001a).

The first public case of HIV infection in Kenya occurred in 1984. Since 1985, the government of Kenya, with the support of the United Nations, bilateral agencies, nongovernmental organizations, community based organizations, and religious institutions, has made an effort toward addressing the HIV/AIDS issue (Akwara, et al., 2003). Since HIV/AIDS was not yet perceived as a threat, the focus for NASCOP was awareness creation, blood safety, and clinical management of AIDS related opportunistic diseases. By 1992, it was evident that HIV/AIDS is related to sexually transmitted infections and in 1994, the National AIDS and STD Control Programme was established. Although the acronym remained the same i.e. NASCOP, the focus of attention included STI. Yet, a sex education in elementary schools bill was scampered in 1996, and paradoxically, AIDS became a national disaster that required concerted efforts to bring under control, within three years. The parliament elected in 2003 created a more integrated approach to HIV under a parliamentary group—something that Ghana achieved by 2000.

The two countries differ in their strands of the virus as well as in the incidence and prevalence of the disease. In Ghana, HIV-1 is the predominant agent, accounting for 94.4% of cases; 5.1% of cases are dual infections of both HIV-1 and HIV-2. Only 0.5% of all infections are entirely HIV-2 (Ghana Health Service [GHS], 2004). The strand in Kenya is the more aggressive HIV-2, possibly explaining the even gender distribution of AIDS in Kenya by 1999 (National Council for Population and Development, [NCPD], Central Bureau of Statistics [CBS], Macro International Inc. [MI], 1999).

Despite some scientists' belief that the epidemiology of HIV is complete, several outcomes of the disease that defy scientific projections remain poorly understood (Carael & Holmes, 2003). Drawing samples from four African cities representing high- and low-prevalence areas, Carael & Holmes examine ecological and individual-level analyses of risk factors for HIV infection. Although individual level demographics and reported sexual behavior were found to be similar in high- and low-prevalence areas, they differed in terms of ecological variables. Including herpes simplex virus type 2 (HSV-2) disease condition was more common and male circumcision was less common in high-prevalence areas (Auvert, et al., 2001). The Global Coalition on Women and AIDS realized that targeting risk groups might fail unless evidence-based and effective prevention strategies and interventions are developed, as there could be a mismatch between the principal sources of the epidemic and programmatic responses and resource allocation (UNAIDS & WHO, 2007). The fact that infected women outnumber infected men supports this argument. For example, the infection ratio of women to men in Ghana and Kenya stand at 1.8:1 and 1.9:1, respectively.

Research confirms that women perceive a greater risk of infection and account for higher rates of infection. Regarding marriage and HIV infection, women in Ghana experience an increased risk of infection by getting married, while in Kenya, especially among discordant couples, women are more prone to infection than men are. This implies that Kenyan women have higher risks before marriage while Ghanaian women have increased risks of infection within marriage. Such inferences may not apply to the general population, however, since the samples are not representative. Compared to men, women are more vulnerable to infection at an early age. While early marriage and early initiation of sex increase the risk of infection among women, it is unclear which poses a greater threat, early marriage or early initiation of sex, and what impact marital characteristics may have. Additionally, the impacts of marital characteristics remain unexplored.

Policies

Given the stigmatization associated with HIV/AIDS and the macro lenses used to view HIV, programs have human rights underpinnings at the individual level and broader goals for groups of individuals based on the degree of risky sexual behavior. Despite criticism regarding its lack of a target population (e.g., Muturi, 2005), education through mass media is common and often packaged with information promoting the values of abstinence, fidelity, and condom use (ABC) as well as voluntary and confidential testing and counseling services. Social marketing, “the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence voluntary behavior of target audiences in order to improve their personal welfare and that of their society” (Andreasen, 1995, p. 7), promotes condoms without targeting any specific group. In reality, however, the accessibility of condoms is low.

Achievements of the goals that Ghana and Kenya have set are rooted in rights to knowledge and health. Both countries aim to enhance treatment coverage and reduction in mother-to child-transmission (MCT), both of which involve the use of anti-retroviral.

Policies continue to be formulated regarding the implementation of prevention and care interventions. Mayhew (2003) analyzed the impact of decentralization on sexual and reproductive health services, including HIV/AIDS, in Ghana. Donor-set agendas and centrally controlled decisions impede integration among programs and reduce the quality of services that the public receives. “Health fund budgets to district level come earmarked not by service allocations but by salaries, capital expenditure, administration and service-related expenses” (Mayhew, p. 78.). Such macro-level policies expect greater responsibility on the part of service providers, including the government and nongovernmental organizations. Both Ghana and Kenya are grappling with challenges implementing decentralization policies and integrating services among general medical, family planning, and STI clinic.

In June 2006, Kenya joined six other nations in the world by criminalizing HIV infection through sexual contact, bringing the responsibility mentioned above down to individuals. In this regard, Kenya is one-step ahead of Ghana. Kenya’s HIV and AIDS Prevention and Sexual Offence Acts were both instituted in 2006. The former specifically holds infected individuals responsible for taking measures to ensure prevention. The burden of proof is left to whichever spouse perceives him- or herself aggrieved. The latter is more comprehensive general sexual offences legislation, with a segment stipulating that knowingly infecting a sexual partner with HIV is a criminal offence punishable under the law with imprisonment of no less than 15 years. These laws are in place

although less than 14% of Kenyans have tested for HIV and an even smaller proportion of the population is aware of its HIV status. Fierce pieces of legislation that are yet to deliver results, both laws are criticized for being counterproductive to prevention. The possibility that results could be used as evidence against them in court will discourage individuals from being tested. Additionally, pregnant women will be discouraged from visiting prenatal clinics, where they would be mandatorily tested, for fear of being taken to court.

Factors Associated with HIV Infection in sub-Saharan Africa

Heterosexual intercourse accounts for 75 to 80% of HIV infections in Ghana (Akwara, Fosu, Govindasamy, Alayon & Hyslop, 2005) and 90% in Kenya (Gouws, White, Stover & Brown, 2006). Primary behavior change (PBC) denotes changes in sexual behavior, as socio-behavioral factors have been identified as central to HIV/AIDS (Green, 2004). These changes include a reduction in casual sex relations, increase in condom use, and delay in sexual debut (Mahomva, et al., 2006). They have been prompted by increased awareness about AIDS and growing anxiety about AIDS mortality (Macintyre, Brown & Sosler, 2001; UNAIDS & WHO, 2006). Because the cross-sectional research that predominates is poor at capturing behavior improvement, other attempts have been made to isolate the factors that lead to risky sexual behavior. Additionally, health infrastructure has improved according to the recommendations and mandates of the World Health Organization (WHO), since it established the biomedical factors associated with HIV infection. They include safe medical procedures such as blood screening, sterilization of medical equipment, and preventing mother-to-child transmission, also referred to as vertical transmission, through medication.

Trends observed in prevention and differences observed in the prevalence of HIV/AIDS across regions have led to several hypotheses. Early differences observed in prevalence rates were explained by the strand of HIV. Western regions of Africa were hypothesized as being plagued by HIV-2, which is less infectious, while HIV-1 is found in southern and eastern regions. To date, this hypothesis remains unsubstantiated (Carael & Holmes, 2001). Other epidemiological factors associated with infection include sexually transmitted infection (STI) and male circumcision. Several factors related to biomedical and socio- cultural contexts have been identified as being associated with HIV infection. While the biomedical factors tend to be empirically demonstrated in research, diverse and not easily measurable socio-behavioral factors remain a challenge in terms of prioritizing and refining interventions. The analytical review of the association between the latter factors is presented in this section.

Individual demographics

Individuals acquire attributes that enable them to react in ways that may increase or decrease their likelihood of being infected with HIV.

Socio-economic status (SES) and HIV infection. The influence of SES on HIV prevalence has remained contradictory. The Demographic Health Surveys in Kenya and Tanzania have indicated that HIV prevalence is highest among the wealthiest in the population (Bingenheimer, 2007). Johnson & Way (2006) also found that the wealthiest women in Kenya are almost three times more likely to be infected with HIV than the poorest women are. However, Bingenheimer notes that the DHS wealth index omits traditional sources of wealth, such as land, animals, and human labor; the survey focuses on modern cash economy such as purchased assets. Still, Nii-Amoo Dodoo, Zulu & Ezeh

(2007) examined the impact of economic deprivation on risky sexual behavior outcomes in Kenya and found that poverty compounds vulnerability to HIV infection. They observe that urban poverty is more severe than rural, forcing urban dwellers to engage in risky sexual behavior, including survival sex.

Religion and HIV. The difficulty in separating cultural practices and religious beliefs makes understanding the role of religion in HIV infection a challenge. Gray (2004) surveyed published journal articles on HIV prevalence and found that six out of seven of the studies indicate a negative relationship between Muslim religious identification and HIV prevalence. Studies that seek to establish HIV risk factors in Muslim communities, however, have generated mixed findings. For example, the cultural practice of male circumcision that is associated with low prevalence is common among Muslims. This could partly explain the low prevalence found within the community, discounting the religious impact of Islam. Nilses et al., (2000) found religious identification not to be associated with HIV prevalence. Addai (2000) analyzed the 1993 Demographic Health Survey for Ghana to determine differences in sexual initiations between never-married and married women based on religious affiliation. The results indicate that women who subscribe to more liberal religious groups, such as Catholic and Protestants, are more likely to engage in premarital sex than those who subscribe to more conservative traditional religions, sectarian Christianity, or no religion. Whether religion influences engagement in premarital sex remains inconclusive, but if we choose to use Addai's findings to influence our study, religion may be assumed to play a role in HIV infection.

Healthcare decision-making and HIV. While seeking healthcare has been associated with mortality and morbidity long before HIV, such that the epidemic has only underscored the association. Since women tend to be under the guardianship of a male relative such as a father or husband, their autonomy to make decisions about their health might be compromised. It could also be used as a measure of empowerment. Women who have the autonomy to make their own healthcare decisions could be deemed more empowered than those who do not. They may be in a position to make decisions about various aspects of health, including having protected sex. Research (e.g. Sunmola, 2001; Volk & Koopman, 2001) has shown that protected sex in heterosexual contacts has remained the prerogative of men.

Socio-cultural context and HIV infection

HIV's skewed infection ratio complicates the diversity of cultural practices associated with it. Compelling arguments associate cultural practices that oppress women with HIV infection. Some practices, such as early marriage, enhance the chances of HIV infection as they result in a higher frequency of unprotected sex, often with older men who have had multiple sex partners (Clark, 2004). The practice of wife inheritance, which in some cases are like re-marriages, also increases the likelihood of HIV infection (Nyindo, 2005). Additionally, regions in which gender-based violence is common record a high prevalence of HIV (CBS, 2004). Marital rape increases the risk of infection. These oppressive treatments of women led Patterson & London (2002) to observe that "in each society, those who before the arrival of HIV/AIDS were marginalized, stigmatized and discriminated against become, over time, those at highest risk of HIV infection" (p. 964).

Literature calling for the abandonment of cultural practices that are associated with higher rates of HIV infection abounds.

Age. Life course theory captures the relevance of age to when landmark cultural norms like sexual debut and marriage occur in a woman's life. The impact of age is interesting because on one hand, it is an individualistic variable and on the other, it reveals the cultural norms of a community. Studies of cross-generational sexual relationships, where the man is a generation older than the woman, most explicitly address relational age differences. Such relationships, wherein older men infect younger women with less power to negotiate for protected sex are among the risk indicators first identified with the gender divide in HIV prevalence (e.g., Longfeild, Glick, Waithaka & Berman, 2004). Also within the theme of relational age differences, Hallet, Gregson, Lewis, Lopman & Garnett (2007) developed a model that determines the population-level impact of reducing cross-generational sex and delaying sexual debut on the heterosexual spread of HIV. Their model suggests that a reduction in cross-generational sex has little impact unless it is accompanied by a reduction in the number of sexual contacts. The model also suggests that peer-to-peer sexual mixing could support endemic levels of HIV; both male preference for younger partners and female postponement of marriage while interacting with multiple sexual partners could reduce the benefit of delayed sexual debut. Age has to be considered within the cultural norms of sexual debut, relational differences, and sexual partner preferences to determine if it is a risk factor.

Bongaarts (2006) identifies delayed marriage as a significant factor in explaining the difference between high- and low-prevalence regions of sub-Saharan Africa. Delayed marriage can be a risk factor when combined with early sexual debut, as women are

likely to have multiple sexual partners during the years before marriage. Early marriage can also be a risk factor, however; Clark (2004) found that girls who marry early are four times more likely to be infected with HIV than their unmarried counterparts who are equally sexually active. Although other studies citing high frequency of sex within marriage and low condom use support this (e.g., Akinyemiju, 2006), Clark proposes limited or nonexistent reproductive health services for this particular group as the plausible explanation. Young women who marry early tend to be reticent to seek reproductive healthcare. The existence of both traditional practice of early marriage and the desired and more contemporary practice of delaying marriage, which is revered for enabling girls to pursue further education and develop a career, constitute a double bind in the era of HIV. Comparing the degree of impact between the two options could inform interventions that are more appropriate.

Residence. Differences between urban and rural areas in Africa are great. Ethnic enclaves exist in rural areas, while urban areas are more cosmopolitan. HIV infection often spreads from urban to rural areas. HIV/AIDS awareness and service provision are more common in urban areas than in rural areas, as is high-quality healthcare.

HIV/AIDS infection in marriage

In the era of HIV and in the sub-Saharan region where it is an epidemic, married couples may be categorized by their HIV-infection status. The superscripts "+" and "-" indicate the presence or absence of HIV infection respectively. Studies have found varied outcomes for HIV infection within marriage. For example, ORC Macro conducted a study that supports the notion that in areas with higher prevalence, there is higher risk of infection before marriage. Representing ORC Macro at the 2007 HIV Implementers'

Meeting, Mishra presented findings that call into question the common belief that men are responsible for HIV infection within marriage. The study found that among discordant couples, women are often more likely than men to be infected with HIV. Of women in discordant marriages, Côte d'Ivoire and Kenya report that more than 60% are infected, while Ghana reports that 48% are infected.

Bongaarts' (2006) comparative study aiming to account for differences observed in low- and high-prevalence regions of sub-Saharan Africa supports these findings. The author found that women in areas that have registered high prevalence, such as Kenya, marry at a later age on average than those in low-prevalence areas, such as Ghana. The study affirms the hypothesis that a late average age at marriage contributes to the spread of HIV, especially when sexual activity is initiated prior to marriage. Findings from Bongaarts' study imply that marriage per se might not account for infection, and rather that delayed marriage accompanied by prior initiation of sex is responsible. They are not conclusive, however, especially considering that another study (Ghana Statistical Services, Noguchi Memorial Institute for Medical Research, ORC Macro, 2004) found that infection among Ghanaian women is higher at later ages in long-term marriages. Additionally, when Bracher, et al. (2003) compared three regions in Malawi in terms of sexual debut and the timing of marriage, they found that those who delay marriage also delay sexual debut, while those who initiate sex early marry equally early, in accordance with the regions-specific marriage model. Although the Bracher, et al.'s study was confined to one country with a relatively small sample, the results raise questions about Bongaarts' findings and have implications for the enigma of cultural influences on HIV infection. To support the theory that marriage poses a great risk of infection for women,

Spark-du Preez, et al. (2004) suggest that the increased risks observed among widows, separated, and divorced women could be attributed to marriage as post effects.

Akwara, Madise & Hinde (2003) used a general population to identify factors associated with risk perception. Married women are less likely to perceive risk compared to widowed, single, divorced, and separated women. However, studies on specific groups are beginning to show that HIV infection is greater among married women than among unmarried counterparts (e.g., Akinyemiju, 2006; Clark, 2004; Glynn, et. al, 2001; Nilses, et al., 2000 and Spark-du Preez, et al., 2004). To draw a general conclusion that marriage is the risk factor would be inaccurate, however, because testing positive while married does not reveal whether infection occurred before or after marriage. Many women test for HIV during the process of undergoing pre-natal care. However, although the regular social act of getting married can be a risk factor for women, prevention efforts continue to target risk behaviors that men are more likely to exhibit. One of the Bush Administration's international initiatives, the United States President's Emergency Plan for AIDS Relief (PEPFAR) for example, applies interventions based on risk groups. Launched in 2003, the PEPFAR initiative to support HIV programs in selected developing countries, including Kenya, fails to identify married women as a risk group. Both the U.S. Senate and House approved a continuation of PEPFAR in 2008, although they removed 1/3 of the funding. The second phase of PEPFAR still reflects the ABC approach and married women remain untargeted as a risk group.

Besides behavior, the context of women's sexual relations may better capture the risks associated with HIV infection. There is an assumption that sex within marriage is not only sanctioned, but also safe. Akinyemiju (2006) observes that protected sex is

unlikely in marriage because of the desire to have children, assumption of imputed trust, love, and commitment. Often when marital status is included as an independent variable, married women, with the exception of those in polygamous marriages, tend to be at less risk of HIV infection. Additionally, biomedical solutions, such as diagnosis and treatment of sexually transmitted infections (STIs), are advocated for members of risk groups such as CSWs but not for married women even in areas where the epidemic has been described as generalized within the broader population (UNAIDS & WHO, 2006).

Multiple sexual partners. There is an assumption that women practice sexual exclusivity in marriage, thus lowering their risk of HIV infection (Hattori & Nii-Amoo Dodoo, 2007). However, studies are beginning to reveal that women–like men—are active sexual agents and do voluntarily engage in extramarital sex (Tawfik & Watkins, 2007) or are coerced into extramarital sex for survival as evident in fish-for sex transactions (e.g. Bene & Merten, 2008; Merten & Haller, 2007). The latter is more commonly cited in literature. Contradictory reports are evident in studies on condom use and extramarital sex among women. While de Walque (2006) found that married women engaging in extramarital sex are less likely to use condoms than single women are, Chimbiri (2007) focused on married women as the unit of analysis and found that condom use is more common in extramarital sex.

Non-empirical literature includes remarriage as one risk to HIV infection (Ntozi, 1997). Women marrying HIV-infected men who have lost their previous wives to HIV/AIDS, for example, are at risk of contracting the disease. Additionally, several studies (e.g., Bove & Valeggia, 2009; Dada-Adegbola, 2004; Esu-Williams, 2000; Nii-Amoo Dodoo & Ampofo, 2001) have established polygamy as a risk for women in terms

of HIV infection. For every additional woman that a man marries, the risk of infection within the marriage increases. Because condom-use is minimal within marriage, women in polygynous marriages are also at high risk of contracting HIV/AIDS indirectly from co-wives engaging in extramarital sex. Thus, while remarriage constitutes a vertical risk that increases over time—with each serial marriage—polygyny constitutes both horizontal and vertical risk that occurs almost concurrently. Research has not established which of the two forms of marriage, polygyny or remarriage, accounts more for risk of infection among women. Considering that women of different marital statuses are differently situated in terms of their risk of HIV infection, Akinyemiju (2006) suggests a cohort study to provide greater insight on individual and contextual factors. The present study is an attempt to respond to this call to separate the situations of married women from those of other women.

CHAPTER THREE

Methodology

This chapter describes the study's design, including the source of data, population and sample selection, measurements, procedures, and analytical methods. The process was followed to meet the purpose of study: to establish the marital risk factors associated with HIV infection among women when controlling for individual demographics, sexual behavior, and socio-cultural factors.

Study design

The design of this study reflects a priori assumptions about control variables based on a review of related literature addressing the risks of HIV infection. Ghana and Kenya are chosen as the study sites. The sample was drawn from cross-sectional data originally gathered to gauge the wellbeing of women and children. Specifically, respondents constitute the women whose responses to selected questions were used to answer the research question.

Data source

The Measure Demographic Health Survey (Measure DHS) provides the source data for this study. This United States-funded project provides selected developing countries with technical and financial assistance in collecting information about a wide range of topics. Though data collected are comparable across countries, collaboration with each host country allows options of data collection to be tailored to fit its specific monitoring and evaluation needs. Measure DHS have the following objectives : 1) to provide leaders in survey countries with population and health data useful for informed decision-making; 2) to expand and improve the worldwide body of information on

population and health; 3) to advance survey methodology through the implementation of technically sound surveys; and 4) to develop the skills and resources necessary to conduct high quality demographic and health surveys in participating countries (Measure Demographic Health Survey, 2009). Measure DHS achieves its goals through model questionnaires that are reviewed and modified in phases. Countries are encouraged to adopt the entire model questionnaire, but to add questions of particular interest and delete those that are irrelevant. Data collection takes place every 5 years.

Measure DHS collects primary data using three types of core questionnaires. A household questionnaire collects information about characteristics of the household's dwelling unit as well as data related to the height and weight of women and children in the household. It is also used to identify members of the household who are eligible for an individual interview. Eligible members are then interviewed using a questionnaire for individual women or men. Data collected relate to household respondent characteristics, wealth and socio-economic status, education; malaria, nutrition, anemia; child health, infant and child mortality; fertility and fertility preferences, family planning, maternal health and mortality; HIV/AIDS knowledge, attitudes, behavior, and prevalence; female genital cutting (FGC), gender-based/ domestic violence, and women's empowerment (Measure DHS, 2009).

Demographic Health Surveys are nationally representative population-based surveys with large sample sizes (usually between 5,000 and 30,000 households). In all households, women age 15-49 are eligible to participate. There are also several standardized modules for countries with interest in particular topics (Measure DHS, 2009). The present study draws items from a women's questionnaire conducted in both

Ghana and Kenya in 2003. The survey items were subsequently merged with HIV data also from Measure DHS to allow HIV infection status to be analyzed in terms of factors revealed through the survey.

Research question

As mentioned, the goal of this study is to determine marital risk factors associated with HIV infection among women in Ghana and Kenya. The specific research question is, when individual demographic characteristics including age, SES, degree of autonomy to make healthcare decisions, religious affiliation, socio-cultural contexts, and sexual behavior are controlled for, do marital factors account for HIV infection among married women in Ghana and Kenya? To follow are the research hypotheses.

Hypotheses

H_1 Because HIV infection is associated with risky sexual behavior, high SES, early initiation of sex, etc., it is hypothesized that married women who are infected with HIV would be significantly different from those who are not.

H_2 Research remains inconclusive about the amount of risk on HIV infection as it relates to marriage. Several theories have been proposed from the results of different studies. Timing of both sexual debut and marriage, and marital characteristics are variables associated with HIV infection. These variables' individual strengths of association have not been differentiated, however, although such information could influence the development of interventions targeted to turning points associated with risks of infection during the course of women's lives. It is therefore hypothesized that factors, including individual demographics, sexual behavior, socio-cultural contexts, and

marital characteristics, differ in their degrees of association with HIV infection among married women.

H_3 SES is a latent variable that is often constituted from others, including education and income. Education increases awareness about risks and prevention from infection and therefore is likely enhance efficacy in prevention. Education for women is as a source of empowerment. SES, however, has been found to increase the risk of HIV infection in some populations and decrease it in others. It is hypothesized that higher SES reduces the risk for HIV infection.

H_4 Cross-generational extramarital relationships have been found to increase the risk of infection for women, who are often the younger of the two partners. In such relationships, women are less likely to be able to negotiate safer sex. Because the number of partners is likely to increase with age, it is hypothesized that the older the husband, the higher the risk of HIV infection will be for his wife.

H_5 The several different types of marriages in Africa can loosely be divided into two categories: traditional and nontraditional. Within these classifications, Akinyemiju (2006) found that legally married women are less at risk of HIV infection compared to women who are in customary/ traditional marriages. The hypothesis is that women in legally recognized marriages with certificates would be at a reduced risk of HIV infection compared to those who are living together or in traditional marriages.

H_6 It is still unclear exactly when the risk of infection is greatest for married women considering that a large proportion of women marries and spends most of life within marriage. Literature shows that in Ghana, married women have an increased risk of infection, while in Kenya, premarital sex accounts for women's increased risk of

infection. It is thus hypothesized that the risk of infection increases with the number of years of marriage in Ghana and number of years before marriage in Kenya.

Married women as the unit of analysis

Married women are chosen as the unit of analysis because their sex history allows the periods before and after marriage to be compared. The after-marriage period includes marital characteristics as pertinent relational variables. Besides, since marriage is a legal and/or social union, it lends itself to both policy as well as educational interventions. Although the number of women who opt for marriage seems to be declining, while the reverse is the case for men (CBS, 2002), marriage is still a common phenomenon in Kenya. The rate of marriage is higher in regions with a high prevalence of HIV/AIDS (CBS, 2004). Sixteen percent of marriages in Kenya are polygamous and seven percent of married couples are discordant.

Ghana sample selection

The sample was drawn from a random, nationally representative sample of 11,972 women aged 15 to 49 who participated in the 2003 Demographic Health Survey (DHS). This sample was selected based on two criteria: first, the participant must have consented to be tested for HIV, and second, she had to be married by the time of data collection. The majority (81.6%) were tested for HIV/AIDS. Almost half (46.8%) of the women who were tested for HIV/AIDS did not indicate their marital status. The breakdown of those who did included 1,440 (15%) who have never married, 2,766 (28.9%) who are married, 420 (4.4%) who are living together, 95 (1%) who are widowed, 167 (1.7%) who are divorced, and 201 (2.1%) who are not living together. Of the 9,585 women who were

tested, the 3,187 who indicated that they are married or living with a partner formed the sampling frame.

Kenya sample selection

The sample for the study was drawn from a random, nationally representative sample of 12,952 women aged 15 to 49 who participated in the 2003 Demographic Health Survey. The selection of this sample was based on two criteria: first, the participant must have consented for HIV testing, and second, she had to be married or living with a partner at the time of data collection. Of 12,952 female participants, more than half (8,195 or 63%) reported their marital status and 4,757 (37%) did not. The second selection criterion yielded 1,985 that tested for HIV while 2,891 did not. Of these 8,076 women, 2,466 responded that they have never married, 337 are widowed, 143 are divorced, 373 are separated, and 4,757 respondents have missing data and are thus omitted. The resulting sampling frame consists of 4,876 married women.

Running a *t* test on age and duration of marriage shows that those who tested for HIV are not significantly different from those who did not. Using *t* tests to compare the 68.9% cases without missing values with the 29.1% that have at least one item missing, no significant difference is observed between the two groups. Analysis of the missing values within the group who tested for HIV leads to a further reduction of the sample by 104. Cases with missing values are omitted from analysis. The results presented are based on 1,657 married women.

Measurements

Determining which items to include among the independent variables took place through the following process. The DHS survey codebook helped in the identification of

items that capture the socio-cultural and sexual behavior factors associated with HIV infection among married women in Ghana and Kenya, per the research questions of this study. Marital characteristics, some of which are computed, are included to deepen the understanding of marriage.

Dependent variable

HIV status was determined through blood testing. Those who tested *negative* and *positive* are coded "0" and "1" respectively, as this research is designed to identify risk factors associated with HIV infection. Logistic regression estimates the likelihood of infection as a function of selected variables. HIV status is the dependent variable upon which the independent variables are regressed to answer the research question.

Independent variables

Theory, literature, and statistical analysis guided the process of selecting variables to include in the study's analysis.

Individual demographics

Socio-economic status (SES). A common indicator of SES is education, whose effect on HIV infection is paradoxical for men and inconclusive for women. On one hand, education is hailed as enabling individuals to gain knowledge about HIV prevention. On the other hand, however, it is associated with social mobility, increasing the tendency for multiple sex partners. Nii-Amoo Dodoo, et al., (2007) reveal how the urban poor often engage in risky sexual behavior more than their rural counterparts do. The study seeks a linear relationship since HIV infection has only two points; namely HIV+ and HIV-. The SES scale is derived from 10 selected items that are categorized under household assets and how frequent an individual utilized what is available. These

are: *type of cooking fuel, frequency of reading newspaper or magazine, frequency of listening to radio,* and *frequency of watching television. Type of cooking fuel* was recoded to reverse the scale such that *electricity and LPG/ natural gas* are coded as "5," *kerosene* as "4," *charcoal* as "3," *firewood/ straw* as "2," and *dung* as "1." The respondent choices for the next three items are: *not at all*, coded as "0," *less than once a week* as "1," *at least once a week* as "2," and *almost every day* "3." The education scale is *no education*, coded as "0," *incomplete primary* as "1," *complete primary* as "2," *incomplete secondary* coded as "3," *complete secondary* as "4," and *higher* as "5." Individuals were asked whether the household has a *refrigerator*, *motorcycle/ scooter*, *truck/ car*, *radio*, and *electricity*. These have scores of "0" if not available and "1" if available. Correlations are run among the 10 items and the range is between .26 and .6, all having p values <.05. Although *listening to the radio* and *having a radio* have a correlation coefficient of .62, both items are retained in the scale because when either is omitted, the reliability score reduced by one unit. To have a scale with higher reliability, 10 items are included. The Cronbach alpha score is .75, which is a reasonable strength measurement that can be used to develop a scale (Leech, Barrett & Morgan, 2008). Item scores are summed to create an SES total for each case. The scale has a skewness of .8, ranging from "2" as the lowest SES and "23" as the highest.

Access to health care. A set of items that required respondents to gauge the degree of difficulty they face in accessing healthcare was used to create a scale. The items were phrased with the stem "getting medical help for self" followed by a statement describing the challenge as follows: *concern no female health care provider, not wanting to go alone, having to take transport, distance to health facility, getting needed money for*

treatment, and *getting permission to go.* For each, respondents indicated whether it is a *big* or *small* problem, which were originally coded "1" and "2," respectively. The responses were recoded such that big problems remained "1" and small problems were coded as "0." Correlations are run among the items to identify any multicollinearity. The coefficients indicate that multicollinearity is not a problem. The Cronbach reliability alpha is .74. A summation of item scores create a health access scale that measures the level of difficulty experienced in accessing health care. Higher scores indicate a greater challenge. The scale ranges from "0," meaning minimal problems in accessing healthcare, to "7" as the highest score for most challenges. A health scale was created only for Ghanaian respondents, as the items were recorded as missing among Kenyan respondents. The measurement has a skewness of .81, which falls within the acceptable range of -1 to 1 for regression analysis according to Leech, et al. (2008).

Religion. Religion can provide a moral framework for individuals. For example, the Catholic Church condones the use of condoms neither as a means of protection from STIs, including HIV/AIDS, nor as a means of family planning. The church's moral values are abstinence before, and fidelity within, marriage. Muslim communities across the world have maintained low levels of HIV prevalence. Religious groups are dummy coded; being the majority, Evangelical Protestant Christians are the reference group in the statistical analysis. Other categories include Catholic, Muslim, Presbyterian, Methodist, Anglican, and those who do not subscribe to any religion.

Final say on own health care. To measure women's degree of empowerment Measure DHS asked, "who has the final say on own healthcare?" The choices are: *respondent alone*, coded as "1," *respondent and husband* as "2," *respondent and other*

person as "3," *husband/ partner alone* as "4," *someone else* as "5," *decision not made/ not applicable* as "6." The item was reverse coded so that *respondent alone* has the highest score of "5," *respondent and husband* was recoded as "4," "3" remained the same, *husband alone* was recoded as "2," and *someone else* was recoded as "1."

Sexual behavior

Two variables depicting life course sex-related turning points for women are included:

Delayed marriage. Bongaarts (2006) coined the concept of delayed marriage through a comparative analysis of HIV transmission between high- and low-prevalence areas. The author found that women from high-prevalence areas tend to delay marriage after initiating sexual intercourse compared to their counterparts in low-prevalence areas. Respondents identified their ages at sexual debut and at first marriage. The difference between the two ages was calculated to determine whether delayed marriage had occurred. A few respondents who initiated sex some time after marriage are categorized as having had no experience of premarital sex.

Age at 1st intercourse. This phenomenon has been of interest within the social sciences, particularly demographic and population studies, for its role in fertility. Since HIV is transmitted through heterosexual contact, age at sexual debut has implications for risk. A young age at sexual debut increases the risk of infection.

Socio-cultural factors

Several cultural practices have been identified as promoting the spread of HIV. Culture provides a moral frame for sanctioning human action and therefore influences behavior. The socio-cultural factors considered in this study concern the practice of

female circumcision and the comparative influence of rural and urban communities. Rural communities are assumed more traditional than urban communities, where increased multiculturalism leads to the expectation of more openness to change.

Female circumcision practiced in community. The practice of female circumcision has been identified as a proxy indicator for hegemonic cultural practices that negatively affect women (Yount & Abraham, 2007). Although this study does not establish causality, female circumcision is included as a socio-cultural factor to gauge its relationship with HIV infection among married women. Answers to the question "does your community practice female circumcision?" are coded "1" for *yes* and "0" for *no*.

Residence. Rural and urban areas in sub-Saharan Africa differ considerably. Urban areas are generally relatively better placed in terms of availability of resources. Families living in urban areas are more likely to be relatively open to information that gets in and out of family boundaries hence influencing behavior. Families that are more traditional are likely to be found in rural communities that share the same language and cultural norms that influence sexual behavior as well as outcomes of the same. *Rural residence* is coded "0" and *urban residence* as "1." The more open family boundaries associated with urban environments compared to rural areas are assumed to be detrimental from the perspective of HIV infection.

Marital characteristics

Age at 1st marriage. Clark (2004) found that early marriage is a risk indicator for HIV transmission among married girls. This variable is included in the present study.

Current marital status. The type of union, whether traditional or nontraditional, is considered. For Kenya, the three categories include *marriages having certificates*, which

are coded as “1,” *customary marriages* as “2,” and *living together* as “3.” Akinyemiju (2006) found that those with certificates are at a reduced risk of HIV infection compared to those without. The scores of “2” and “3” were recoded as “1,” and “1” was recoded as “0.” For Ghana, two types of marriage are included: those who are *married* are coded as “0” and those *cohabiting* are coded as “1.”

Husband lives in house. Husband *living in the house with the wife* is coded as “0” and husband *living away from the house* is coded “1.”

Differences in educational attainment between spouses. Since men are often more educated than women are, differences in educational attainment between spouses were calculated by subtracting the attainment level of the women from that of the men. The women’s educational attainment has five categories: *no education* is coded as “0,” *incomplete primary* as “1,” *complete primary* as “2,” *incomplete secondary* as “3,” *complete secondary* as “4,” and *higher* as “5.” These were recoded to match the partner’s educational attainment categories such that the category with *no education* remained “0,” up to *primary* is coded as “1” and “2,” up to *secondary* is coded as “3” and “4,” and *higher* is coded as “5.” The categories were reduced to four, ranging from “0” to “3.” The few women that are more highly educated than their spouses are coded as having equivalent educational attainment as their spouses.

Age difference. Respondents stated their own age and the age of their partners, while the age difference between them was computed. Since men often marry women who are younger than they are, age difference was calculated by subtracting the age of the women from that of the men. The few cases in which respondents are older than their spouses are coded as if there is no age difference. Older men are found less likely to

practice safe sex and more likely to be polygamous (Nii-Amoo Dodoo & Ampofo, 2001). It is thus hypothesized that the wider the age difference between the spouses, with the men being the older spouse, the higher the risk of infection among women. Women who are older than their partners might be at reduced risk than their younger counterparts.

Multiple sex partners. The risky sexual behaviors in marriage include *remarriage, polygamy,* and *extramarital sex*. These are coded "0" when the risk is absent and "1" when the respondent identified the risk. For example, to determine whether polygamy exists, the respondent was asked, "how many other wives does your husband have?" To determine whether they have extramarital sex, the women were asked to state the number of men other than their husbands that they have had sex with in the last 12 months. The responses were recoded such that *at least one incidence of extramarital sex* is coded as "1" and *no extramarital sex* is coded as "0." Respondents were also asked to indicate how many unions they have had, including the current one. This question establishes whether the respondent has remarried. *More than one union* is coded "1" and if their current union is the *only one*, it is coded "0."

Table 7 presents details on the selected variables.

Procedure

Data used in the study were collected through interviews conducted by trained data collectors over a period of several months. A detailed questionnaire was developed to gather detailed information from a cluster random sample of women representative of the populations of Ghana and Kenya. Women were interviewed in the privacy of their homes to facilitate the sharing of sensitive information regarding reproduction, fertility, pre- and post-natal care, knowledge of HIV, sexual behavior, and gender-based violence.

The first task was to select variables from the DHS that would answer the present research question. The more than 40 variables selected reflect the women's demographic characteristics, health indicators, occurrence of domestic violence, sexual behavior, socio-cultural context, and marital characteristics. A couple of variables about their partners are also included to deepen the knowledge regarding marriage.

Analytical method

Logistic regression involves few assumptions compared to other methods intended to determine association between dependent and independent variables (Leech, et al., 2008). The conditions of logistic regression that are met include: mutually exclusive variables, a dichotomous dependent variable, and a large sample containing not less than 60 cases and not less than 20 cases per predictor (Leech, et al.). To minimize the effects of multicollinearity, correlations are run on all the variables that are identified as being associated with HIV infection. Some variables are dropped from the analysis to avoid multicollinearity. They include both individual and partner demographic variables. The individual variables included age, number of children borne, and age at first childbirth. Age at first childbirth and age at the time of interview have correlations greater than .6 with age at first marriage and age at first sexual intercourse. Since timing of sexual debut is more important to the study objective than timing of childbirth, variables related to the latter are dropped from analysis. Another set of variables dropped on their own merit, but retained for comparison, are partner age and partner educational attainment. Age of respondent was also dropped because it strongly correlates with other time-bound variables. Gender-based violence was dropped in both countries because of missing responses. (See Table 2 for a detailed correlation matrix.)

Missing values. After running frequencies on selected variables, cases with more than 30% missing values were omitted. They include health and domestic violence. For Kenya, 32 variables are used in the analysis. Both MVA on SPSS 16 and *t* test are used to analyze the missing values. Kenya has 1,657 (87.4%) cases with complete data. Results of the little MCAR analysis using 32 variables are a chi square = 12.42, DF=7, and p value of .08. When the chi square is insignificant, missing values could be assumed completely random (Acock, 2005). Further *t* test also showed that the cases with missing and those without missing are not significantly different. When compared in terms of years in marriage, age at first intercourse, and age in general, those with complete responses and those with missing responses are not different. The *t* tests for equality of means are all negative, with p values > .05. The sample for Kenya is 1,657. Analysis of the missing values showed that 64.6% and 87.4% of the cases for Ghana and Kenya, respectively, have complete data. To determine if a significant difference exists between cases with complete data and those with incomplete data, comparisons were run using *t* tests. Results for both countries show that no significant difference exists between cases with missing values and those without. Subsequently, cases with missing values were omitted from analysis. A total of 2,057 and 1,657 cases compose the samples for Ghana and Kenya respectively.

For the first hypothesis, *t* test and chi-square are used to determine if married women who are infected are significantly different from those who are not. The rest of the hypotheses are tested using hierarchical logistic regression that differentiates between groups of related variables as well as within groups. For example, this allowed comparison of *delayed marriage* and *age of first marriage* as distinct factors attributed to

HIV infection among women. The first entry block includes individual-level variables: *socio-economic status (SES), access to healthcare, religion,* and *the degree of autonomy in final healthcare decision-making.* The second block includes *delayed marriage* and *age at first intercourse.* The third block includes *community practice of female circumcision* and *rural* or *urban* residence. The fourth block includes the following marital characteristics: *age at first marriage, age difference between spouses, differences in levels of educational attainment, remarriage, extramarital sex, polygamy, duration* and *type of marriage,* as well as whether the *husband lives with wife* or *elsewhere.*

CHAPTER FOUR

Results

This section includes the results of the statistical analysis used to answer the research question: when factors associated with individual attributes, socio-cultural context and sexual behavior are controlled for, do marital characteristics account for HIV infection among married women in Ghana and Kenya. Descriptive statistics characterize the samples as follows.

Ghana sample

Table 2 displays the statistical description of the Ghana sample, which has a mean age of 32.9 (*SD*=8.2). The mean age at sexual debut, first marriage, and first birth are 17.2, 18.8, and 20.1 respectively, suggesting a sequence that begins with premarital sex, moves on to marriage, and ends with birth of the first child. The sample mean for socio-economic status is 7.2, which is slightly below the midpoint on a 0 to 19 scale. Respondents do not find accessing health care an extreme challenge, as the mean score is 1.8 on a scale from 0 to 7. The majority (61.4%) live in rural areas while 38.6% live in urban areas. About 90% reported being married, with only 10% cohabitating, 77% are in monogamous marriages, while about 23% are in polygynous marriages. Almost 26% have remarried at least once. As far as living arrangements, the majority (72.7%) of women's husbands live with them. Only 1.7% reported having had extra marital sexual intercourse within the last 12 months of the interview. Only 2.6% tested positive for HIV.

Ghana results

H_1 It was hypothesized that married women who are infected with HIV would be significantly different from those who are not in terms of individual demographics,

sexual behavior, socio-cultural factors, and marital characteristics. The results of both *t* and chi square tests lead to the failure to reject the null hypothesis. As displayed in Table 2, the two groups of married women differ in two regards. First, the infected women had a longer period between the time of their sexual debut and time of marriage compared to the non-infected group. The mean duration between sexual debut and marriage is 2.7 years (*SD*=3.4) for the infected women and 1.9 years (*SD* =3.1) for the uninfected women. Second, the chi square result on the impact of remarriage is $\chi^2(1, \mathrm{N} = 2{,}057) = 7.24, p < .05$, indicating that remarriage has a statistically significant influence on increasing the odds of infection. Although only 26.6% of the total marriages are remarriages, remarriages accounted for almost half (41.7%) of the infections within the sample of married women.

H_2 It was hypothesized that the factors listed in the first hypothesis would have different degrees of impact when estimating the likelihood for HIV infection among married women. As shown in Table 3, the results of hierarchical logistic regression support rejecting the null hypothesis. The Nagelkerke *R* square changes are as follows: 2.3% is accounted for by individual demographics and .8% by sexual behavior. Socio-cultural factors and marital characteristics account for 1.2% and 2.2%, respectively. Individual demographics and marital characteristics each account for one third of the total variability explained by the model, appearing to be bearing equal proportions of impact. The remaining two factors, sexual behavior and socio-cultural contexts, almost shared the remaining one third equally.

H_3 It was hypothesized that high SES for married women reduced the risk of HIV infection. The null hypothesis is rejected because both the *t* test and hierarchical

logistic regression results, shown in Tables 2 and 3 respectively, indicate that SES is a negative predictor. However, it should be noted that the results are both statistically insignificant and marginal. In fact, the *t* test is -.26, p value >.05, and at 10.1 (*SD*=3.8), the mean SES of those infected is only slightly higher than 9.9 (*SD*=4.7), the mean SES of those who are uninfected. Regarding the regression results, the slight negative effect of SES reduced almost to zero with each additional model in the equation. The consistent reduction in the value of β shows that the positive influence of SES diminishes.

H_4 The greater the age differences between spouses, the more likely female partners were hypothesized to experience risk of infection. The mean age difference between spouses is 7.1 years, with men being the older partners. Although age difference increases the odds of infection, the increase is statistically insignificant.

H_5 The hypothesis was that married women would be at a reduced risk of HIV infection compared to women who are living with their partners. As the results in Table 3 show, this hypothesis is supported. Women who are living with their partners are 1.3 times more likely to be infected than those who are married. However, this difference is also statistically insignificant.

H_6 Considering the difference in prevalence in the two countries, it was hypothesized that risks of infection for Ghanaian women would be different from those for Kenyan women. The null hypothesis is rejected. Results for Ghana show that marital characteristics account for 2.2%, whereas the whole model accounts for 6.5%, of the total variability. Marital characteristics therefore account for about 1/3 of the total variability that the model explains. In contrast, the results for Kenya show that control factors account for about half (6%) collectively; the other half (5.7%) of variability is almost

entirely accounted for by marital characteristics. When you control for individual demographics, sexual behavior, and socio-cultural context, marital characteristics are the only significant factors accounting for HIV infection among married women. For the Kenyan sample, polygyny, remarriage, and traditional marriages that are not legally endorsed are risk factors that increase the likelihood of infection. In the Ghanaian sample, remarriage is the only marital risk factor that is statistically significant. In both countries, those who have been in relatively longer marriages have a reduced risk of being infected. The results tend to support retaining the null hypothesis—the variables appear to have a generally similar impact on HIV infection among married women in both countries, the only difference being that some of the differences are statistically significant in Kenya. The directions of the associations, however, are largely similar.

Logistic regression model

The model explains 6.5% of the variance in HIV infection among married women in Ghana. With every additional model, the power to explain variability improves with the negative 2Log Likelihood decreasing from 526.5 in the first model to 506.49 when the last model is added. The model chi square also increases in value from 10.72 in model A to 30.73.

Individual demographics

Although SES is a statistically insignificant predictor, its trend suggests that a higher SES marginally reduces the risk of infection. The logistic regression results also indicate that with every additional rise in the level of SES, the odds of being infected with HIV marginally decrease by 1.0. As indicated on Table 3, women who have others, including their husbands, participate in their personal healthcare decision reduce the odds

of infection by .94. Increased accessibility to healthcare also reduces the odds of infection by .94. Methodists have the highest odds of infection with HIV. Catholics, those who do not register with any religion, and Anglicans follow them in descending order.

Sexual behavior

The two variables that characterize sexual behavior are age at sexual debut and delayed marriage. The latter is significant in models B and C, but insignificant in models D after marital characteristics are added to the model. The beta coefficient of delayed marriage, however, increases from .07 in model C to .26 in the full model. Delayed marriage increases the odds of being infected by 1.30. In models B and C, delayed sexual debut reduces the odds of contracting HIV. However, in the full model, delaying sexual debut increases the odds by 1.5.

Socio-cultural factors

The odds that women who live in the urban resident reduces the odds of being infected by .70 times that of their rural counterparts. All the infected women are from communities that do not practice female circumcision. From this sample, it can thus be deduced that among married women, the practice of female circumcision reduces the odds of being infected.

Marital characteristics

The number of unions (remarriage) is the only marital characteristic that significantly and positively predicts HIV infection, as almost half (41.7%) of the infected are from the 26.6% of the women who indicate that they have remarried. Some of the marital characteristics that are also statistically insignificant, but that reduce the odds of getting infected, are years in marriage, age at first marriage, engaging in extramarital sex,

and partners' difference in educational attainment. The specific reduction in odds are 1, .83, .73, and .94 respectively. In contrast, polygyny, large age difference, cohabitation, and husbands living away from home all increase the odds of infection by 1.32, 1, 1.31, and 1.31 respectively. These latter variables are the marital risk factors that are positively associated with HIV infection.

Kenya sample

Table 5 displays the descriptive statistics of the Kenya sample, which has a mean age of 30.9 (*SD*=8.4). The mean age at sexual debut is 16.8 (*SD*=3.1), age at first marriage is a little higher at 18.9, and age at first birth is 19.2, again suggesting a trend of early initiation of sex followed by marriage and then birth of the first child. The majority (77.7%) live in the same household with their partners, while 22.2% have partners/ husbands who stay elsewhere. About 45% of the women's partners have final say on their healthcare, while 37% have total autonomy in this decision-making area. A majority (63%) are from communities that do not practice female circumcision, while 37.5% are from communities that do. Customary marriage is common, as 80% are in such unions and only 20% have legal marriage certificates. About 7% have remarried at least once and 17.8% are in polygynous marriages. The mean age difference between partners is 7.6 years (*SD*=.2). Very few women (2.2 %) report having had extramarital sex in the 12 months prior to the interview. Almost 8% tested positive for HIV.

H_1 It was hypothesized that married women who are infected with HIV would be significantly different from those who are not in terms of individual demographics, sexual behavior, socio-cultural factors, and marital characteristics. The null hypothesis is rejected, as both *t* test and chi square tests show that the two groups of women are

different in some respects. Those who are infected have a mean SES of 9.9 (*SD* 4.2) compared to 8.9 (*SD* 4.4) among the uninfected. The difference in-group means showed that risk factors include delayed marriage, with infected women at M3.7 (*SD* 4.1) and the uninfected women's at M2.1 (*SD* 3.0). Thirty-two percent of urban residents are infected compared to 20.8% of their rural counterparts. Infection rates are higher (71.7%) in communities that do not practice female circumcision. Multiple sex partners through remarriage and polygyny account for higher infection rates. Specifically, 13.4% of the infected women have remarried, while a much smaller percentage (5.9%) of the uninfected group has done so. Polygynous marriages have a 25.2% rate of infection compared to 16.1% within monogamous marriages. Only 7.9% of legally married women are infected, although legally married women also compose 19.1% of the uninfected. Table 4 shows the results with group mean differences between women who are infected and those who are not.

H_2 It was hypothesized that factors identified in the first hypothesis would have different degrees of influence in estimating the likelihood for HIV infection among married women. As shown in Table 6, the results of a hierarchical logistic regression support failing to reject the null hypothesis. The Nagelkerke R square changes showing in every model, from 2% in the first one, constituted of individual demographics, followed by 3% for sexual behavior, 1% for socio-cultural factors, and an additional 5.7% for marital characteristics. The latter account for almost half of what the total model is able to explain.

H_3 It was hypothesized that the higher the SES among married women, the lower their risk of HIV infection. As shown in Table 5, SES is a significant correlate, with a *t*

test result of -2.4, p value >.05. Those who are infected have a mean SES of 9.9 (*SD*= 4.2)—significantly higher than that of the uninfected, which is 8.9 (*SD*=4.4). Hierarchical logistic regression indicates that SES is only significant in models A and B. However, with each additional level of SES, the odds of being infected increase by 1.06. High SES is a risk factor

H_4 The greater the age difference between the spouses, the more likely the woman was hypothesized to experience a risk of infection. Results lead to a failure to reject this hypothesis. While the regression results indicate that age difference somewhat reduce the risk by 1, the *t* test results shows that age difference is statistically insignificant. The wide range of age differences illustrates the presence of cross-generation marital relationships.

H_5 It was hypothesized that women in legally recognized marriages with certificates would be at a reduced risk of HIV infection compared to those who are living together or in traditional customary marriages. The results support this hypothesis. Type of marriage is one of the three marital characteristics that are found significantly associated with HIV infection. Traditional and common-law marriages are the majority, and women in such unions are 2.22 times more likely to be infected than those in marriages with legal certificates are.

Logistic regression model

The model explains 11.7% of variance in HIV infection among married women in Kenya. With every additional model, the power to explain variability improves with -2LL, decreasing from 883.5 in the first model to 813.63 when the last model is added.

The model chi square also increases in value from 13.5, p value >.05 in model A to 83.36, p value >.001.

Individual demographics

Women's empowerment indicators such as SES, which can enable women to act in their own self-interest, degree of autonomy to make personal healthcare decisions, religious affiliation, and ability to access healthcare, are used as individual attributes that influence HIV status outcomes for married women. Socio-economic status is significant only in models A and B. With every additional rise in the level of SES, the odds of being infected with HIV increase by 1.06. Increased autonomy and participation in personal healthcare decision reduces the odds of being infected by .94. Protestant Christians have the highest odds of being infected with HIV. Catholics, Muslims, and those who do not have any religious affiliation follow them in descending order. Compared to Protestant Christians, individuals who identify as belonging to other religions have relatively reduced odds of being infected, with Catholics having a marginal difference from protestant Christians.

Sexual behavior

The two variables that characterize sexual behavior are age at sexual debut and delayed marriage. The latter is significant in models A and B but insignificant in models C and D. Delayed marriage increases the odds of being infected by 1.10. The longer women delay initiating sexual intercourse, the less likely they are to contract HIV. Abstinence is effective when practiced.

Socio-cultural factors

The odds that women who live in the urban areas will be infected be infected by HIV are 1.30 times that of their rural counterparts. Although this factor is only significant in model A, it has a positive association with infection outcomes in all the models. The odds that married women from communities that practice female circumcision will be infected are .73 times more than that of married women from communities that do not.

Marital characteristics

The number of unions (remarriage), type of marriage, and polygyny are the only marital characteristics that are significant predictors of being infected. They increase the odds of being infected by 2.82, 2.20, and 2.38 respectively. In contrast, years in marriage are the only statistically significant negative predictor. Every additional year in marriage reduces the odds of being infected by about 1 for women in this sample. Other factors that reduce the odds of being infected, but are statistically insignificant, are husbands living away, age at first marriage, number of sexual partners, and partner age difference. Difference in educational attainment increases the odds of infection, but is also statistically insignificant.

Results: Comparing Ghana and Kenya

The results show that the contexts and life course of married women in each country are similar but differ in specific ways. First, the prevalence of infection stands at 2.9% and 7.7% in Ghana and Kenya respectively. A difference is also registered in the mean age of participants, with the Kenyan sample being younger—their mean age is M=30.9 (*SD*=8.2) while that of the Ghanaian sample is M=32.9 (*SD*=8.2). The total variance accounted for by the models differs by country, with Ghana's explaining about 7% and Kenya is explaining about 12%. Generally, women followed a similar sequence

of premarital sex, marriage, and first birth—, which seemingly occurs within marriage. Regarding specific variables, those that have opposite impacts include: final say on healthcare decision-making, area of residence, and husband living away. The latter have a marginal opposite impact, as Ghana records a negative association and Kenya records a positive one. However, the degree of autonomy to have the final say on health care decision-making increases the risk of infection among married women in Ghana but does not do so in Kenya. Another difference lies in the risk associated with area of residence: urban residency reduces the risk of infection in Ghana, but does not do so in Kenya. Generally, marital characteristics in both countries follow similar trends except for the influence of husband living in the same household and partner difference in educational attainment. In Ghana, the husband living away increases the risk of infection, but it does not do so in Kenya. Similarly, a difference in the educational attainment between partners is a risk factor in Kenya, but not in Ghana.

The opposite effect of SES in the two countries could have several explanations. The higher disease burden in Kenya compared to Ghana may exacerbate the impact of risky sexual behavior. As the degree of autonomy to make personal healthcare decision increases the risk of infection, greater challenges in accessing healthcare reduce the odds of being infected. The Kenyan results contradict this finding. Perhaps the measures of empowerment are not valid for the Ghanaian sample. Could it be that access to healthcare be more appropriately measure structural or geographical barriers as opposed to individual barriers? Other areas in which the two countries differ relate to residence. Women residing in urban settings in Ghana are at reduced risk of infection while women residing in urban settings in Kenya are at increased risk.

Husband living away from home may reduce the odds of infection for women in Kenya because the high condom use associated with extramarital sex protects them from transmission (Chimbiri, 2007). It may also result from a reduced frequency of sexual intercourse, identified as a preventive measure (Clark, 2004). Husband living away from home increased the odds of infection for women in Ghana, however. Perhaps in Ghana, the nationally low prevalence reduces married women's perceptions of the risk of HIV infection, leading them to engage in unprotected extramarital sex. Again, results suggest that Ghana and Kenya are both similar and different in terms of the risk factors associated with HIV infection among women.

CHAPTER FIVE

Discussion

The purpose of the study is to determine the marital risk factors associated with HIV infection among married women in Ghana and Kenya, while considering individual demographics, sexual behavior, and socio-cultural factors. These factors are categorized under two related conceptual frameworks: life course and ecological. Both theories contextualize the turning points of sex life from before marriage to capture the interplay exhibited in a normative behavior between individual attributes and culture. The behavior was statistically analyzed to determine whether it perpetuates HIV infection among married women. In summary, the models explained the variance of HIV infection among married women in Ghana and Kenya. The differences observed in the strengths and directions of association could be explained by social meanings embedded within the phenomena, the validity of the measurements, and HIV prevalence within the general population, or disease burden. According to the UNAIDS classifications of the epidemic, having not crossed the 5% threshold of prevalence, Ghana is considered a low-prevalence area for HIV/AIDS. The disease is an epidemic in Kenya, however.

Individual system

Analysis of the individual demographic factors aside from religion yield unexpected results. First, although higher SES is correlated worldwide with increased access to quality healthcare and subsequently better health, in Kenya it is associated with higher rates of HIV infection. In Ghana, SES had minimal negative effect on the risk of HIV, which reduced with each additional model. These results question the role of poverty in the spread of HIV throughout the continent although several authors associate

HIV with poverty. For example, de Vogli & Birbeck (2005) outline plausible pathways for structural adjustment program (SAP) policies that are associated with increased poverty to make women and children in sub-Saharan Africa vulnerable to HIV/AIDS. According to the United Nations Economic Commission for Africa (UNECA, 1989), SAPs are macroeconomic policies that developing countries must adopt to obtain loans and grants from the World Bank (WB) and International Monetary Fund (IMF) to develop the agricultural and industrial sectors of their economies. The WB and IMF require that countries receiving their funds devalue their currency, increase interest rates, institute trade liberalization, and impose wage and hiring freezes. Directly and indirectly, the financial liberalization, removal of food subsidies, and introduction of user fees for healthcare and education negatively affect efforts to halt the spread of HIV among poor women and children.

It is possible that the lack of positive association between HIV infection and low SES results from the lack of representation of HIV-positive individuals from lower SES in the data. Considering that poverty increases risky sexual behavior (e.g. Bene, & Merten, 2008; Nii-Amoo Dodoo, et al., 2007) and compromises access to healthcare, it is plausible that the positive association observed between SES and HIV infection is due the fact that infected low-SES individuals die more quickly. The infected low- SES individuals are less likely to be represented in the cross-sectional surveys conducted every five years. Individuals from higher SES are more likely to live longer and therefore are counted in the surveys.

Though it seems paradoxical for higher SES levels to increase the risk of infection, this could be explained by Parikh's (2007) finding in Uganda that young,

unemployed women intentionally seek affluent men for economic support in exchange for sex and/or marriage. Women of higher SES also enjoy a degree of freedom that might accommodate risky extramarital sex. Social mobility has thus become exploitative and detrimental in terms of HIV infection.

Policies that counter the negative effects of inequity in resources that increase the risk of HIV infection that is associated with higher SES levels are needed. Especially as men with high SES are consistently at risk because, women from all SES may be seeking their economic support in exchange for marriage or sex. Marrying women of a similarly high SES would still increase their chances of infection with HIV, since a higher SES increases the likelihood of multiple sexual partners. Because they attract women, such individuals are also vulnerable to affluent polygyny (Nwoye, 2007).

Sexual behavior

Delayed marriage has a greater impact on HIV infection risk than age at sexual debut, implying that early marriage, which coincides with sexual debut, is essentially less risky. One classic sexual behavior risk that dominated earlier interventions—multiple sexual partners—still applies today. One indicator of multiple sexual partners before marriage is delayed marriage. Literal delay of marriage is desired as it allows the girls to mature before taking up adult responsibilities including marriage. Women are then more likely to maximize their potential through education and employment. The potential achievements of women who delay marriage could be jeopardized, however, if they initiate sex early, especially in the HIV era. As human rights' frameworks prohibit early marriage, the choice for policymakers and challenge for practitioners lies in promoting a delay in sexual debut or promoting protected sex even among youth. Both options will be

difficult in Kenya, where the bill to support sex education in schools was defeated in 1996. The Catholic Church in Africa has categorically denounced condom promotion. Debates around the sexual behavior of youth are likely to continue even after the risks have been identified, as moral authorities such as the Catholic Church and Kenyan Government do not support sex education, believing that it encourages youth to engage in sex. In fact, the ABC model first promotes abstinence among youth. This narrow approach adopted for intervention has been exacerbated by the fallacy that premarital sex is a recent development that was non-existent in pre-colonial Africa (Glaser and Delius, 2005). This has created nostalgia for these past times to the extent that some interventions include the re-creation of the traditional sex education as a means to educate youth for HIV prevention. This type of education concentrated on family values that primarily linked sex with marriage and procreation (Demehin, 1983). While the recreation of past models for sex education is laudable, the content remains very narrow. Learning that even when married youth are unlikely to be attended to in family planning clinics, Clark, Bruce & Dude (2006) advocated for reproductive health interventions to be specifically targeted to that segment of the population. Even if the clinics provide condoms, youth are least likely to visit the clinics.

Socio-cultural factors

The fact that results showed that the practice of female circumcision, a practice that is outlawed, reduces risks of infection calls for reexamining the validity of the measurement as an indicator of oppression among women. Since Patterson and London (2001) have argued that oppressive treatment of women increases the risk of infection. In this study, community practice of female circumcision could be a measure for the male

sexual partners and not the implications of the practice on the female per se. This is because communities that practice female circumcision are likely to do the same with males. Male circumcision reduces the risk of infection (Weiss, Quigley & Hayes, 2000). This would explain why the practice reduced the risk of infection.

Regarding rural/ urban residency, outcomes could be explained partly by the disparities between the two areas. The theory of female emigration and return to the villages could explain the increased risks observed in the rural areas in Ghana (Agyei-Mensah, 2001). Increased risks of infection among urban residents in Kenya could be accounted for by the dual existence of extreme poverty and wealthy individuals in the cities in Kenya. The connection between the economic classes could be partly explained by Nii-Amoo Dodoo and colleagues' research in 2007, which reported high-risk sexual behavior adopted by the female urban poor in Nairobi for survival. The risks include survival sex with men from all categories of SES. Provisions such as nightclubs, which are concentrated in the urban centers, would support all of these.

Marital risk factors

The risk of HIV infection for married women increases if the marriage is a traditional marriage without a certificate, polygynous marriage, or remarriage. Multiple sexual partners characterize all these marriages, in which protected sex is least likely to be the norm. Chen, et al. (2007) conducted a systemic review of 68 epidemiological studies in sub-Saharan Africa on infected individuals and an uninfected control population. They found that besides paid sex, STIs, and HSV-2, multiple sex partners are a significant HIV transmission factor. The risk factor of multiple sex partners is captured either explicitly or implicitly in multiple variables and through the relationships described

by the respondents. Polygyny and remarriage are the explicit risk factors, as multiple sex partners characterize them concurrently and serially, respectively. Implicit risks include cases in which respondents do not categorically state that they have had multiple sex partners but provide evidence of delayed marriages or traditional marriages (lacking a legal certificate). In these cases, multiple sex partners can be assumed; delayed marriage, for example, implies involvement in uncommitted relationships with weak sexual boundaries, possibly including engagement in unprotected premarital sex.

At the same time, delayed marriage is lauded for reducing fertility as well as infant and maternal morbidity and mortality and for enabling women to access education and consequently employment (CBS, 2004). Of course, if higher SES increases the risk of HIV infection, then women who delay marriage to pursue further education and possibly employment may be at greater risk. Moreover, once sexual intercourse has been initiated, delaying marriage becomes a risk because it allows for multiple sexual partners. Gage & Meekers (1994) found that women with primary education alone had the highest level of premarital sexual activity in Kenya. Women who only have a primary education are vulnerable in any sexual relationship. Could women be delaying marriage without furthering their educations, leading to the observed increase in risk of infection?

Regarding explicit risk factors, polygyny and remarriage are important. Several authors have argued that married women find themselves in situations where they have little if any control (Esu-Williams, 2000; Nyindo, 2005; Patterson & London, 2002). In fact, Parikh (2007) posits that the greatest risk of HIV infection for married women is the extramarital sexual activity of their husbands. The findings of the present study suggest that husbands' extramarital sexual activity may not apply to all cases of infection. In fact,

the sexual life course of women follows norms that expose them to risks of infection both before and after marriage. Premarital sex, which has been held as nonexistent in pre-colonial Africa, presents great risks related to HIV infection in contemporary Africa. A majority of women in both Ghana and Kenya reported having engaged in premarital sex, and among discordant couples in Kenya, women are more likely to be the infected partner (Freeman & Glynn, 2004).

Once a woman is married, the type of marriage she is in determines whether multiple sexual partners are still implied or not. This is because traditional marriages are likely to become polygynous. In terms of HIV infection, cohabitation poses risks in Ghana while traditional marriages (without legal certificates) do so in Kenya. While both imply the possibility of multiple sex partners, the effect of cohabitation in Ghana is not statistically significant. Inasmuch as women report fewer multiple sexual intercourse engagements compared to men, cultural norms allow men to seek multiple women for sexual relationships implies that implicitly, women are in sexual relationships that are more or less like having multiple partners as well. It appears that in Kenya, legally contracted marriages are better able to restrict sexual boundaries, and subsequently safeguard couples from HIV infection, than either cohabitation or traditional marriages are. Legally married women also tend to be of the highest SES. Not necessarily socially and economically dependent on their husbands, these women are empowered to question their husbands' extramarital activity, negotiate for safe sex (Parikh, 2007), and seek and access quality healthcare.

Traditional marriages without certificates are at risk of becoming polygynous. Polygyny has an effect on transmission of HIV and other STIs (Adeokun & Nalwadda,

1997; Caldwell, Anarfi & Caldwell, 1997). Extramarital sexual activity is more common among polygynous men than among monogamous men, especially during postpartum sexual abstinence (Blanc & Gage, 2000; Lawoyin & Larson, 2002). Additionally, loose emotional ties and a lack of communication about sexual health (Orubuloye, Caldwell & Caldwell, 1997) often characterize the relationship between polygynous spouses. Lastly, polygynous marriages face strains related to competition, putting younger women, particularly, at elevated risk. In such traditional marriages, older wives may give up sex for the younger wives. Engaging in frequent sexual intercourse in multiple-partner settings, younger wives lack the social status to negotiate for condom use (Tawfik & Watkins, 2007). Although polygyny is not a significant predictor of HIV infection in the Ghanaian sample, the positive direction of its association with HIV infection is a risk indicator.

Bove & Valeggia (2008) found that polygyny is a social mediator of women's vulnerability to disease and poor health outcomes in sub-Saharan Africa. As Lagarde, et al., 2001 and Morris & Kretzzschmar, 1997 reported that in stochastic simulations, concurrent multiple sexual relationships appear to increase transmission of STIs, including HIV more than serial multiple sexual relationships. The present study's findings are contrary to this observation. Remarriage is the greatest risk factor for HIV infection in both Ghana and Kenya. In fact, in Ghana, it is the only statistically significant marital risk factor. Remarriage follows divorce, separation, and widowhood. It can include serial monogamy as well as polygyny. Reasons for divorce and separation may include infidelity. As a result, Reniers (2008) advocates that divorce be included among the behavioral changes that married individuals opt for to prevent HIV infection. The

author argues that if divorce regulates exposure to HIV, its rates should be higher among couples in which one spouse engages in risky sexual behavior or divorce becomes more responsive to risky sexual behavior with increased prevalence. In Malawi, where divorce rates are high, widows and widowers remarry at lower rates than divorced men do and women do. In areas with a high prevalence of HIV, widowhood often results from the death of a spouse from AIDS-related complications. Remarriage consequently constitutes a risk. Individuals who remarry are more vulnerable in the sense that they fear stigmatization if another marriage fails. Widows have increased likelihood of exploitation in remarriage, especially regarding property inheritance.

When religious and public health interventions focus on extramarital sex, individuals who engage in it tend to conceal it. Instead of condemning extramarital sex per se, interventions could identify the factors that motivate the phenomenon and develop appropriate responses. Parikh (2007) observed that some young girls who have limited access to resources arising from a lack of employment and/or education pursue relationships with married men of high SES in an attempt to provide for their needs. The author advocates the establishment of development programs that target both genders, to allow men and women of similar SES and age to interact.

With the exception of SES, all other factors have similar directions of association with infection. Young age of sexual debut and delayed marriage are negative risk factors in both Ghana and Kenya. Traditional marriage, polygynous marriage, and remarriage are all risk factors. The increased of risks of infection for older age at first marriage in Ghana is paradox. The benefits of delayed marriage may be compromised by marrying a polygynous husband who might be from higher SES hence having susceptibility to

infection. The opposite association observed in the Kenyan sample could be that women who delay marriage are likely to legalize their marriage. Since there is bifurcation of formal laws and customs in Kenya, women in legal marriages are able to engage the law for their benefit (Kamau, 2009). The fact that long-term marriage reduced the risk of infection is an indication that such partners have attributes that contribute to the safety. Extramarital sexual activity reduced the risk of HIV infection, implying that protected sex is very likely practiced in such unions.

Policy Implications

Both explicit and implicit policies have been formulated and instituted, to reduce the risks of infection among women in general. They encompass education, public health, and criminal justice. Within education, programs must target married women. Although there is urgent need for further research to establish indigenous knowledge that reduces the risk of infection in different types of marriages, especially long-term ones, the significant positive relationships between multiple partners and HIV infection especially through marriage should be included in a new educative package. The Population Services International (PSI), a social marketing organization, in conjunction with the Ministry of Health, National AIDS and Sexually Transmitted Infections Control Programme, and the National AIDS Control Council, has commendably produced a television campaign against spousal cheating. Other risk factors, such as remarriage and polygyny, should be part of an education package for women but within a culturally appropriate forum. A television advertisement might not provide the appropriate context.

Results of the full model indicate that consensual sex with multiple partners through traditional marriage/ cohabitation, polygyny, and remarriage present the greatest

risk factors for married women. Within the ABC model of prevention, **B**—, which stands for being faithful—would support these unions because they are socially sanctioned. Preventing HIV infection in societies where such marriages are sanctioned has been a challenge. The moral question of whether to apply social marketing of condoms to married individuals for HIV prevention should be considered especially in Kenya, as married individuals are increasingly contracting HIV (IRIN, 2009).

The criticisms of the content and means of communication employed in educational campaigns include their lack of contextual specificity and congruence with the intended message recipients (Muturi, 2005; Witte, et al., 1998). Multiple sex partners are typically referred to as a risk factor for HIV infection. However, the concept of multiple sex partners is open to different cultural interpretations. Many interpret the risk to be restricted to cheating with commercial sex workers and/or extramarital sex. It is imperative to acknowledge that traditional marriage, polygynous marriage, and remarriage as riskier than legal marriage, monogamy, and single unions in terms of HIV infection. Educational efforts must include what research has identified and share the knowledge to include marital options that are safer to facilitate behavioral change and deter apathy from an early age. This could be included in the regular school curriculum in both primary and secondary schools. The Universities have HIV/AIDS prevention programs that should include information on HIV infection risks in marriage as well.

Some churches in sub-Saharan Africa have begun requiring members to test for HIV before marriage. As critics note that voluntary testing is respectful of human rights, it may be worth requiring individuals who are remarrying to test as well. Regardless, testing before marriage might preempt the likelihood of engaging the HIV and AIDS

Prevention Act that criminalizes intentional infection of a partner. Partners who know their status before marriage would be in a better position to reduce the risk of infection. Likewise, individuals in polygynous and traditional marriages need to be more alert to ward off extramarital relationships.

Closely linked to educational campaigns are public health efforts. HIV prevention approaches are guided by human rights principles. It is an individual's right to be tested and share his or her test results. Kenya has two laws. The Kenya Sex Offense Act, 2006 criminalizes intentional infection of a partner within marriage and the Kenya HIV/AIDS Prevention and Control Act 14, 2006 mandates sharing HIV test results with significant others. Critics observe that the law violate individuals' confidential rights and is counter productive to prevention as it is likely to discourage testing, which is considered crucial to prevention. The laws are likely to be least relevant to the consensual sex that is typical of traditional marriage, polygynous marriage, and remarriage. Establishing the time of infection within such relationships is more challenging relative to sexual offences like rape. Moreover, women tend to be less likely to seek justice from the corrupt and gender-biased legal system. Applying the laws in polygynous marriages involving more than two partners would be complicated. For example, co-wives in polygynous marriages sign no legal contract. While criminalizing HIV infection serve as a downstream policy that takes effect post-infection, a public health approach focused on reducing risk and including both long- and short-term interventions may be more effective. The latter would include the following: 1) social marketing of safer sex (e.g., promoting condom use among married individuals in explicitly and implicitly multiple sex relationships), and 2) improved and expanded reproductive health services to both married and unmarried

youth. Currently, family planning clinics that provide reproductive health services only target married individuals (Caldwell & Caldwell, 2002) and reach a relatively small percentage of them. Long-term interventions would include the following: 1) further research to establish the different impacts of affluent and interventive polygyny, 2) use of the research findings to formulate social policies that minimize the chances of affluent polygyny and sexual exploitation of women. In Kenya, these policies would need support from others that enhance outcomes for men as potential partners.

Limitations of the study

Because the study uses secondary data collected for specific purposes, it has some limitations. The collection of data at one point in time precludes the possibility of including changes that may occur over the years. For example, sexual behavior has been reported in other studies as a changing habit based on several factors such as awareness (Green, 2004). The sexual behavior therefore refers to a one-time report that may be an under- or over-statement. Other weaknesses that compromise validity and reliability of some measurements used in the study are also evident.

Although 10 items were used to create an SES scale, Bingenheimer (2007) observes the weakness of the individual items, as the questions are framed to determine asset-based income and therefore fail to reflect cultural wealth such as land, animals, and labor. This failure consequently weakens the reliability of the SES scale. Other measurements whose validity is questionable include autonomy to make healthcare decisions as an indication of empowerment and area of residence and practice of female circumcision as providing socio-cultural context. Results based on these measurements should be interpreted with caution.

A greater degree of autonomy in having final say on personal healthcare decisions reduced the risk of infection for married women in Kenya and did the opposite in Ghana. Ghanaian women benefitted from the collective decision-making about healthcare. This item is therefore questionable as a valid measure of empowerment for women in sub-Saharan Africa. Is it possible that in Ghana, such involvement is indicative of support—financial or otherwise—from the husband and close family members, hence the positive influence of collective decision-making? In Kenya, it may be indicative of a woman's ability to afford and therefore access healthcare. Interpretation must therefore be contextually sensitive which is beyond the scope of this study. Yielding similarly opposite results is area of residence. Researchers assume that rural residence encourages women to practice cultural norms that perpetuate risks for HIV infection. For example there is more polygyny in rural than urban areas (Nii-Amoo Dodoo, 1998). In Ghana, rural residence adds to the risk of HIV infection and rural migration is responsible for increased risks (Agyei-Mensah, 2001). In Kenya, however, risky sexual behavior is more rampant in urban areas (Nii-Amoo Dodoo, et al., 2007).

Like the practice of female circumcision, collective healthcare decision-making is likely not a valid measure of women's oppression.

Recommendations

The limitations of the study and subsequent results lead to a recommendation for further research to enhance understanding of HIV risk factors. Specifically, valid measurements ought to be developed for what constitutes women's empowerment with respect to HIV infection. Additionally, life course analysis that determines the turning points in women's lives that add to their risk or protect them from the risk of HIV

infection would inform educational efforts. Similarly, indicators of socio-cultural contexts that are associated with HIV infection need to be established as distinct from those that are violations of human rights per se. For example, communities that practice female circumcision often practice male circumcision as well. Consequently, the practice of female circumcision variable may actually measure the circumcision of respondents' partners. The surprising results in the present study may therefore reflect the negative association between male circumcision and HIV infection. The practice of female circumcision has been outlawed in many countries in sub-Saharan Africa, and thus the consequences of portraying a false association between female circumcision and reduced rates of HIV infection are great. Like the practice of female circumcision, collective healthcare decision-making is likely not valid measure of women's oppression. Finally, items comprising the SES scale must include cultural indicators of wealth such as animals, land, and labor. A more accurate measure of SES might resolve the mixed effects of SES on HIV infection. Development of more appropriate scales and indicators in general would enhance the quality of interventions targeted to women.

There is need to invest in further longitudinal studies that identify the types of men and women that are most likely to be in traditional marriages, polygynous marriages, and remarriages. Additionally, how such unions address HIV prevention ought to be studied to add indigenous perspectives to the body of knowledge regarding ways to reduce the risk of HIV infection. Comparative studies between legal and traditional marriages, affluent and interventive polygyny would not only draw parallels to highlight differences, but could also identify strengths that the diverse marital types offer. Survival

studies following early and delayed marriages would address whether risk is greatest before or after marriage.

Since long-term marriages have shown resistance to HIV infection, it would be worth researching such marriages to identify factors that provide safeguards against HIV. This would add a much-needed dimension to HIV prevention efforts, which have thus far been dominated by fear and profiles of risky behavior. Kenya is currently running TV advertisements that warn about unfaithfulness within marriage (IRIN, 2009). While this belated response is worthwhile, it should be accompanied by a parallel positive option depicting a stable marriage that introduces hope. Further research could also document other indicators of unfaithfulness within marriage.

Conclusion

The present study used ecological and life course theories to frame the contexts and sexual journeys of married women in Ghana and Kenya. The study's purpose is to determine the impact of marital characteristics on HIV infection rates among this population while controlling for individual empowerment, sexual behavior, and socio-cultural contexts. The following conclusions are drawn from its results. First, the riskiest sexual life course for a married woman starts with early initiation of sexual intercourse, followed by delayed marriage, during which time is a high likelihood of multiple sexual partners. Second, the riskiest types of marriage are cohabitation, traditional marriage, and polygynous marriage. Social norms surrounding sexual behavior continue to play a great role despite the introduction of legal frameworks. After a woman has had her sexual debut, the sexual relationships that follow—in terms of number of partners and whether serial or concurrent—determines her HIV status outcomes. Third, marital characteristics

that constitute and/or implicate serial or concurrent multiple sex partners pose the greatest risk of infection. These include traditional marriage, polygynous marriage, and remarriage. Studies often refer to the dangers of multiple sex partners in ways that suggest that it is relevant exclusively for commercial sex workers and their clients and spousal cheating. Married women are viewed as innocent victims (Brijnath, 2007) leaving the aspect of mate selection by women still wanting. Fourth, the age at sexual debut may not be the greatest determinant of risk itself; rather the type of sexual relationship(s) that follows may be greater determinant. Early initiation of sex into a monogamous union may reduce the risk of infection if the marriage stays monogamous, which is mediated by, biological, cultural, and economical factors. Fifth, the notion that age difference between spouses, where the man is older, would increase women's vulnerability to infection is not supported by the results from this study. In Kenya, age difference reduced the odds of women's infecting, while in Ghana it was positive correlated.

Interventions that are age-specific and risk-group-oriented therefore fail to map the trajectories of sexual journeys within the given contexts, often giving married women a false sense of safety relative to unmarried women. The type of marriage matters after a woman has passed the thresholds of sexual debut and marriage.

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APPENDICES

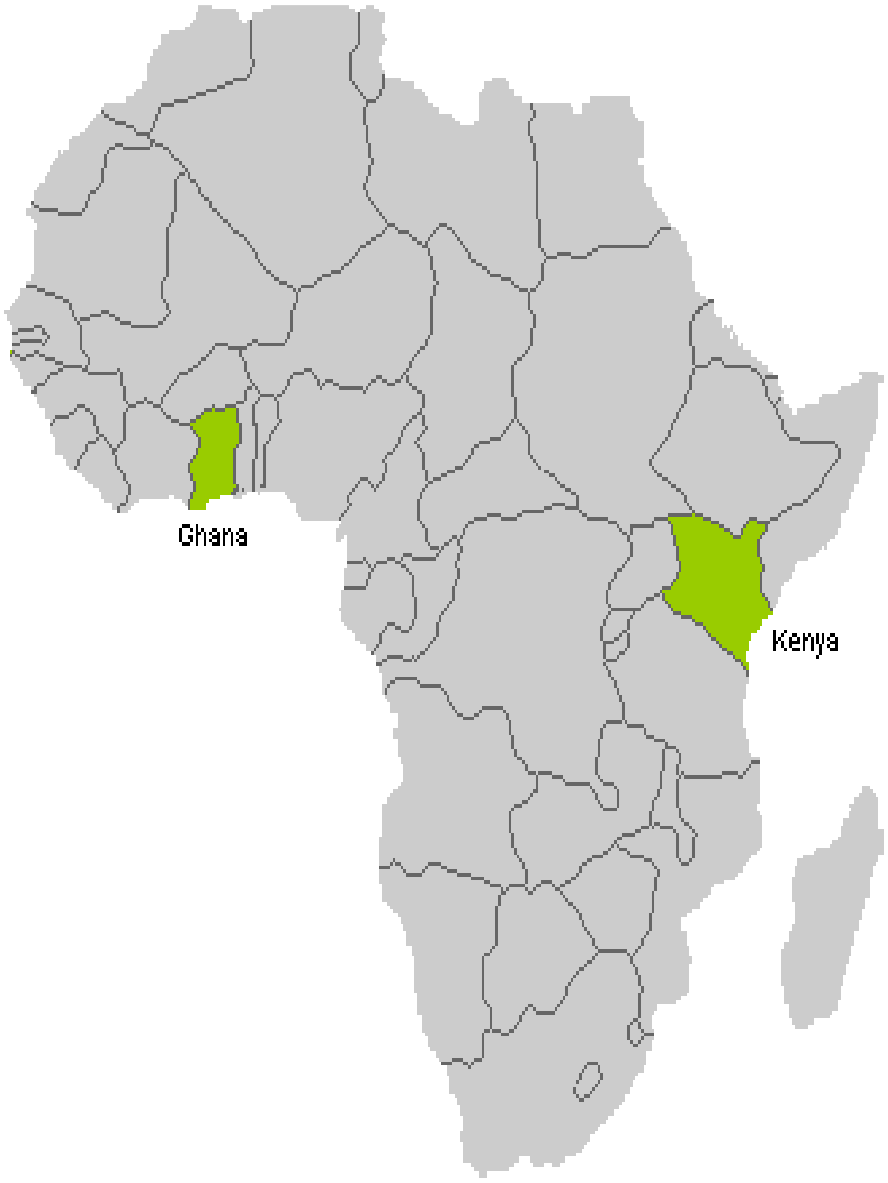

Figure 1: Map of Africa

Table 1.

Intercorrelations for Ghana Married Women HIV Status and Predictor Variables.

Variables	1	2	3	4	5	6	7	8
1. HIV status								
2. Socio-economic status (SES)	.01							
3. Access to health care	-.02	-.38***						
4. Religion	.01	.20***	-.13***					
5. Final say on own health care	.03	.06*	-.02	.05*				
6. Delayed marriage	.05*	.15***	-.09***	.02	.04			
7. Age at 1st intercourse	-.01	.27***	-.08***	.03	.08**	.03		
8. Female circumcision practiced in the community	-.04*	-.11***	.07**	-.05*	.06**	.09***	-.02	
9. Residence	.01	-.55***	.28***	-.17***	-.04	-.06	-.09***	-.12***
10. Current marital status	.04	.01	.00	-.03	.03	.06*	.01	-.03

Variables	1	2	3	4	5	6	7	8
11. Number of unions (remarriage)	.06**	-.07**	.00	.01	.06*	.05*	-.14***	-.04
12. Husband lives in house	.04	.05*	-.01	-.01	.17***	.02	.05*	-.10***
13. Number of other wives	.03	-.22***	.07**	-.13***	.02	.01	-.04*	.08**
14. Age at 1st marriage	.03	.28***	-.13***	.04	.08**	.74***	.55***	-.03
15. Years since marriage	.01	-.07***	-.00	-.04	.12***	-.17***	-.14***	-.01
16. No. other than husband had sex with in the last 12 months	.03	.05**	.03	-.10***	-.01	.00	.01	.00
17. Age difference	-.03	-.21***	.05*	.11***	-.12***	-.02	-.06**	.04
18. Difference in educational attainment between spouses	.01	-.17***	-.03	.05*	.06**	-.01	-.10***	-.07**

Variables	9	10	11	12	13	14	15	16	17
10. Current marital status	-.03								
11. Number of unions (remarriage)	.03	.09***							
12. Husband lives in house	-.11***	.29***	.03						
13. Number of other wives	.14***	.06*	.09***	.14***					
14. Age at 1st marriage	-.19***	-.01	-.13***	.05*	-.02				
15. Years since first marriage	.06**	-.19***	.33***	-.11***	.17***	-.26***			
16. No. other than husband had sex with in the last 12 months	-.02	.39***	.07**	.25***	.03	.00	-.14***		
17. Age difference	.09***	-.06**	.01	-.05*	.25***	-.05*	.09***	-.04	
18. Difference in educational attainment between spouses	.05*	-.03	.07**	-.03	.03	-.06**	.07**	-.04	-.02

Note. HIV Status coded as 1=infected with HIV (HIV+), 0=not infected (HIV-). *p<.05. **p<.01. ***p<.001.

Table 2.

Descriptive Profile of Sample and Differences Between Married Women Infected with HIV and Those who are not in Ghana (N= 2,057).

		HIV Infection Status		
Variables	Total Sample	HIV infected	Not infected with HIV	Difference
HIV status	2057	59 (2.9)	1998 (97.1)	
Individual System				
Socio-economic status (SES)	9.9 (4.7)	10.1 (3.8)	9.9 (4.7)	t=-.26
Access to health care	1.9 (1.8)	1.6 (1.6)	1.9 (1.8)	t=.93
Final say on own health care				$\chi^2 = 5.56$
Alone	740 (36.0)	21 (35.6)	719 (36.0)	
With husband/partner	176 (23.1)	20 (33.9)	456 (22.8)	
Respondent and other person	22 (1.1)	1 (1.7)	21 (1.1)	
Husband alone	662 (32.2)	15 (25.4)	647 (32.4)	
Somebody	157 (7.6)	2 (3.4)	155 (7.8)	
Religion				$\chi^2 = 5.25$
Roman Catholic	346 (16.8)	12 (20.0)	334 (16.7)	
Anglican	32 (1.6)	0 (0)	32 (1.6)	
Methodist	166 (8.1)	7 (11.7)	159 (8.0)	
Presbyterian	202 (9.8)	7 (11.7)	195 (9.8)	

Other Christian	1162 (56.5)	32 (55.0)	1126 (56.5)	
No Religion	149 (7.3)	1 (1.7)	149 (7.5)	
Sexual Behavior				
Delayed marriage	1.9 (3.1)	2.7 (3.4)	1.9 (3.1)	t=-2.15*
Age at 1st intercourse	16.8 (3.1)	17.0 (2.8)	17.2 (2.6)	t=.53
Socio-cultural Factors				
Residence				$\chi^2 = .29$
Rural	1220 (59.3)	37 (62.7)	1183 (59.2)	
Urban	837 (40.7)	22 (37.3)	815 (40.8)	
Female circumcision practiced in community				$\chi^2 = 2.62$
Yes	85 (4.1)	0 (0)	85 (4.3)	
No	1972 (95.9)	59 (100)	1913 (95.7)	
Marital Characteristics				
Number of unions (remarriage)				$\chi^2 = 7.24**$
One	1511 (73.4)	34 (58.3)	1475 (73.9)	
More than one	546 (26.6)	25 (41.7)	521 (26.1)	
Husband lives in house				$\chi^2 = 3.63$
Lives in house	1419 (68.9)	34 (57.6)	1384 (69.3)	
Lives away	639 (31.1)	25 (42.4)	614 (30.7)	

Number of other wives (polygyny)				$\chi^2 = 1.08$
None	1707 (83.0)	46 (78.0)	1661 (83.1)	
One or more	350 (17.0)	13 (22)	337 (16.9)	
Age at 1st marriage	18.9 (3.9)	19.5 (4.6)	18.9 (3.9)	*t*=-1.16
No. other than husband had sex with in the last 12 months				$\chi^2 = .02$
None	1994 (96.9)	57 (96.6)	1937 (96.9)	
One or more	63 (3.1)	2 (3.4)	61 (3.1)	
Years since 1st married	12.9 (8.4)	13.4 (8.4	12.9 (8.4)	*t*=-.42
Type of marriage				$\chi^2 = 2.75$
Married	1758 (85.5)	46 (78)	1712 (85.7)	
Living together	299 (14.5)	13 (22)	286 (14.3)	
Age difference	7.1 (6.4)	7.0 (6.2)	7.1 (6.4)	*t*=.15
Difference in educational attainment between spouses	.5 (.7)	.5 (.7)	.5 (.7)	*t*=-.03

Note: mean values and standard deviation in parentheses for continuous variables and number and percentages for ordinal and categorical variables. Significant differences in married women infected with HIV+ and those who are HIV- free were tested with *t* test for continuous and chi square for ordinal and categorical variables. *p<.05(two-tailed tests) **p<.01 (two tailed tests) ***p<.001 (two tailed tests)

Table 3.

Summary of Logistic Regression Analysis Predicting HIV Status for Married Women in Ghana (N = 2,057)

Measurement	Model A β	Model B β	Model C β	Model D β	SE	e^B
Individual system						
Socio-economic status (SES)	-.02	-.02	-.01	-.00	.04	1.00
Access to health care	-.07	-.06	-.06	-.06	.09	.94
Religion						
Catholic	.18	.18	.49	.08	.35	1.09
Anglican	-17.66	-17.61	-17.46	-17.54	6874.99	.00
Methodist	.40	.43	.42	.25	.43	1.29
No Religion	-1.83	-1.89	-1.88	-.1.88	1.24	.15
Final say on own health care	.13	.12	.13	.09	.10	.90
Sexual Behavior						
Age at 1st intercourse		-.02	-.02	.18	.13	1.54
Delayed marriage			.07*	.26	.14	1.30
Socio-cultural factors						
Residence			-.29	-.35	.33	.70

Female circumcision practiced in community			-17.68	-17.58	4220.15	.00
Marital Characteristics						
Number of unions (remarriage)				.65*	.30	1.92
Type of marriage (legal or not)				.27	.38	1.31
Husbands lives in the house				.27	.30	1.31
Number of other wives (Polygamy)				.28	.35	1.32
Age at 1st marriage				-.19	.13	.83
Years since 1st married				-.01	.02	1.00
No. other than husband had sex with in the last 12 months				-.32	.75	.73
Age difference				.00	.02	1.00
Difference in educational attainment between spouses				-.07	.20	.94
-2LL	526.5	522.64	516.92	506.49		
Model chi square	10.72	14.57	20.92*	30.73 with df 20		
Nagelkerke R square	.02	.03	.04	.07		

Note. e^B = exponentiated B (odds ratio) *p<.05(two tailed test) **p<.01 (two tailed test) ***<.001 (two tailed test)

Table 4

Intercorrelations for Kenya Married Women HIV Status and Predictor Variables

Variables	1	2	3	4	5	6	7	8
1. HIV status								
2. Socio-economic status (SES)	.06*							
3. Final say on health	-.02	.23***						
4. Religion	-.03	-.13***	-.07**					
5. Delayed marriage	.13***	-.10***	.04	-.13***				
6. Age at 1st intercourse	-.05	.37***	.14***	-.01	-.05*			
7. Female circumcision practiced in community	-.05*	-.16***	-.01	.10***	-.06*	-.01		
8. Residence	-.08**	-.51***	-.10	-.02	-.04	-.08**	-.08**	
9. Type of union	.08**	-.19***	-.03	-.08**	.03	-.26***	-.04	.06*
10. Number of unions (remarriage)	.08**	-.08**	-.00	.09***	-.03	-.11***	.00	-.02

Variables	1	2	3	4	5	6	7	8
11. Husband lives in house	-.02	-.01	.15***	-.03	.01	-.02	-.06*	.08**
12. Number of other wives (Polygamy)	.07**	-.18***	-.02	.08**	-.02	-.12***	.02	.06*
13. Age at 1st marriage	.07**	.38***	.14***	-.12***	.62***	.58***	-.09***	-.14***
14. Years since marriage	-.10***	-.15***	.09***	-.03	-.16***	-.18***	.02	.14***
15. No. other than husband had sex with in the last 12 months	.03	-.05	.03	-.01	.09***	-.08**	-.03	-.02
16. Age difference	-.00	-.23***	-.08**	.09***	-.08**	-.19***	-.01	.06*
17. Difference in educational attainment between spouses	.00	-.03	.03	-.05*	.02	-.04	.03	-.04

Variables	9	10	11	12	13	14	15	16
10. Number of unions (remarriage)	.05*							
11. Husband lives in house	.04	-.01						
12. Number of other wives	.08**	.04	.08**					
13. Age at 1st marriage	-.18***	-.11***	-.02	-.11***				
14. Years since first marriage	-.12***	.14***	.10***	.18***	-.29***			
15. No. other than husband had sex with in the last 12 months	.06*	.17***	.09***	.18***	.01	.05*		
16. Age difference	.02	.09***	-.02	.35***	-.22***	.10***	.08**	
17. Difference in educational attainment between spouses	-.02	.01	.00	.01	-.02	.04	.02	.01

Note. HIV Status coded as 1=infected with HIV (HIV+), 0=not infected (HIV-). *p<.05. **p<.01. ***p<.001.

Table 5

Descriptive Profile of Sample and Differences Between Married Women Infected with HIV and Those who are not in Kenya (N= 1,657).

		HIV Infection		
Variables	Total Sample	HIV infected	Not infected with HIV	Difference
HIV status	1657	127 (7.7)	1530 (92.3)	
Individual System				
Socio-economic status (SES)	9.0 (4.4)	9.9 (4.2)	8.9 (4.4)	t=-2.4*
Final say on own health care				$\chi^2 = 2.53$
Alone	663 (40.0)	46 (36.5)	617 (40.3)	
With husband/partner	256 (15.5)	21 (16.7)	235 (15.4)	
Respondent and other person	7 (.4)	0 (0)	7 (.5)	
Husband alone	698 (42.1)	58 (46.0)	640 (41.8)	
Somebody	32 (1.9)	1 (.8)	31 (2.0)	
Religion				$\chi^2 = 5.29$
Roman Catholic	402 (24.3)	31 (24.4)	371 (24.3)	
Protestant/other Christian	1098 (66.5)	91 (71.7)	1007 (66.0)	
Muslim	121 (7.3)	5 (3.9)	116 (7.6)	
No Religion	31 (1.9)	0 (0)	31 (2.0)	
Sexual Behavior				

Delayed marriage	2.1 (0.1)	3.7 (4.1)	2.1 (3.0)	t=-5.36***
Age at 1st intercourse	16.8 (3.1)	16.3 (3.0)	16.8 (3.1)	t=1.9
Socio-cultural Factors				
Residence				$\chi^2 = 9.14$**
Rural	1298 (78.3)	86 (67.7)	1212 (79.2)	
Urban	359 (21.7)	41 (332.2)	318 (20.8)	
Female circumcision practiced in community				$\chi^2 = 4.95$*
Yes	622 (37.5)	36 (28.3)	586 (38.3)	
No	1035 (62.5)	91 (71.7)	944 (61.7)	
Marital Characteristics				
Number of unions (remarriage)				$\chi^2 = 10.93$**
One	1550 (73.4)	110 (86.6)	1440 (94.1)	
More than one	107 (6.5)	17 (13.4)	90(5.9)	
Husband lives in house				$\chi^2 = .34$
Lives in house	1314 (79.3)	104 (81.2)	1210 (7913)	
Lives Away	344 (20.7)	24 (8.8)	320 (20.9)	
Number of other wives (polygyny)				$\chi^2 = 6.98$*
None	1379 (83.2)	95 (74.8)	1284 (83.9)	
One or more	278 (16.8)	32 (25.2)	246 (16.1)	

Age at 1st marriage	18.9 (3.8)	19.8 (4.4)	18.8 (3.8)	*t*=-2.8**
No. other than husband had sex with in the last 12 months				$\chi^2 = 2.01$
None	1621 (97.8)	122 (96.1)	1499 (98.0)	
One or more	36 (2.2)	5 (3.9)	31 (2.0)	
Years since 1st married	11.6 (8.6)	8.7 (7.2)	11.8 (8.7)	*t*=3.9***
Type of Marriage				$\chi^2 = 9.89$**
Married with certificate	302 (18.2)	10 (7.9)	292 (19.1)	
Customary or living together	1355 (81.8)	117 (92.1)	1238 (80.9)	
Age difference	7.6 (.2)	7.2 (5.7)	7.3 (6.2)	*t*=.13
Difference in educational attainment between spouses	.3 (.0)	.3 (.6)	.3 (6)	*t*=-.15

Note: mean values and standard deviation in parentheses for continuous variables and number and percentages for ordinal and categorical variables. Significant differences in married women infected with HIV+ and those who are HIV- free were tested with *t* test for continuous and chi square for ordinal and categorical variables.

*p<.05(two-tailed tests) **p<.01 (two tailed tests) ***p<.001 (two tailed tests)

Table 6.

Summary of Logistic Regression Analysis predicting HIV Status for Married Women in Kenya (N = 1,657)

Measurement	Model A	Model B	Model C	Model D		
	β	β	β	β	SE	e^B
Individual system						
Socio-economic status (SES)	.05*	.06*	.03	.06	.03	1.06
Final say on own health care	-.09	-.09	-.08	-.06	.07	.94
Religion						
Catholic	-.06	-.14	-.16	-.09	.23	.91
Muslim	-.60	-.47	-.60	-.62	.50	.54
No Religion	-18.61	-18.60	-18.60	-18.75	7055.20	.00
Sexual Behavior						
Age at 1st intercourse		-.06	-.05	-.03	.25	.97
Delayed marriage		.10***	.09***	.10	.25	1.10
Socio-cultural factors						
Residence			.52*	.27	.26	1.30
Female circumcision practiced in community			-.33	-.31	.21	.73
Marital Characteristics						
Number of unions (Remarriage)				1.04*	.32	2.82

Type of marriage (with certificate or not)				.80*	.36	2.20
Husbands lives in the house				-.06	.25	.94
Number of other wives (Polygamy)				.87**	.26	2.38
Age at 1st marriage				-.02	.25	.98
Years since first marriage				-.05**	.01	.95
No. other than husband had sex with in the last 12 months				-.21	.56	.78
Age difference				-.01	.02	1.00
Difference in educational attainment between spouses				.04	.17	1.05
-2LL	883.5	860.9	853.9	813.63		
Model chi square	13.5*	36.1***	43.1***	83.4*** with df 18		
Nagelkerke R square	.02	.05	.06	.12		

Note. e^B = exponentiated B (odds ratio) *p<.05(two tailed test) **p<.01 (two tailed test) ***<.001 (two tailed test)

Table 7.

Description of Variable Recoding for Statistical Analytical Method

Variable grouping	Question in the survey	Codes
Dependent variable		
HIV Status	*Blood test result*	1 HIV positive 0 HIV negative 7 indeterminant No recoding
Independent variables		
This variable was used to select cases of married women including those living with a partner.	*Are you currently married or living with a man? (Q501)*	0 Never married 1 married 2 living together 3 widowed 4 divorced 5 not living together (V501) Recode for sample selection, select if 1 or 2
Marital characteristics		
Living arrangements	*Is your husband or partner living with you or elsewhere? (Q505)*	1 living with her 2 staying elsewhere (V504) Recode (1=0) (2=1)
Marriage type Akinyemiju (2006) with cert less risky, i.e. legal marriages safer	*Currently in union*	1 yes, with a certificate 2 yes, married by custom 3 living together (S501) Recode (2, 3=1) (1=0)

Variable grouping	Question in the survey	Codes
Multiple partners (polygamy)	*Does your husband have any other wives besides yourself? (Q507)*	0 no other wives 98 don't know (V505) Recode (0=0) (0=1)
Multiple partners (Remarriage)	*Have you been married or lived with a man only once or more than once? (Q510)*	1 once 2 more than once (V503) Recode (1=0) (2=1)
Multiple partners (extra marital sex)	*No. of men you have had sex with other than husband in the last 12 months*	0 none 1 one 2 more than one (V766A) Recode (>0=1) (0=0)
Years since first marriage		
Age at first marriage		
	How old were you when you started living with him? (Q512)	(V511) age at first marriage
Respondents educational attainment	*What is the highest level of school you attended: primary, vocational, secondary, or higher? (Q 108)*	0 no education, 1 incomplete primary 2 complete primary 3 incomplete secondary 4 complete secondary 5 higher (V149) Recode to match the partners values
Educational attainment differences between partners	*It was assumed that men would be on average more educated than women hence men's-women's.*	(V701- V149) Women who are more educated than their partners were treated as having equivalent educational attainment.

Variable grouping	Question in the survey	Codes
Partner's educational attainment	*What is the highest level of school he attained: primary, vocational, secondary or higher? (Q704)*	0 no education/ preschool 1 primary 2 secondary 3 higher 8 does not know (V701)
Age difference between partners	*Age of the respondent's husband/ partner*	(V730- V012) Negative age difference treated as equivalent to age of partner
Sexual behavior prior to marriage (Covariate)		
Age at first intercourse	*How old were you when you first had sexual intercourse (if ever)? (Q514)*	Never 00 Age in years 96 first time when started living with (first) husband/ partner 97 inconsistent 98 don't know (V531) for Ghana and (V525) imputed (V531) for Kenya
Duration between age at first sex and 1st marriage. Bongaarts (2006)	*Age at 1st marriage and age at first sex*	(V511-V531) Any delay in 1st sex after marriage treated as 1st sex occurred in marriage.
Individual (covariate)		

Variable grouping	Question in the survey	Codes
Healthcare decision making	*Who in your family has the final say on the following decisions: your own healthcare?* (Q719)	1 respondent alone 2 husband/ partner and respondent 3 respondent & other person 4 husband/ partner alone 5 someone else 6 decisions not made/ not applicable (V743A) Reverse code highest 5 & lowest 1
Socio-economic Status (SES)		
Educational attainment	*What is the highest level of school you attended: primary, vocational, secondary, or higher? (Q 108)*	0 no education 1 incomplete primary 2 complete primary 3 incomplete secondary 4 complete secondary 5 higher (V149) Recode to match the partners values
Household assets		0 No 1 Yes
Has electricity	*Whether the household has electricity*	0 No 1 Yes (V119)
Has radio	*Whether the household has a radio*	0 No 1 Yes (V120)
Has television	*Whether the household has a television*	0 No 1 Yes (V121)

Variable grouping	Question in the survey	Codes
Has refrigerator	*Whether the household has a refrigerator*	0 No 1 Yes (V122)
Has bicycle	*Whether a member of the household has a bicycle*	0 No 1 Yes (V123)
Has motorcycle/ scooter	*Whether a member of the household has a motorcycle/ scooter*	0 No 1 Yes (V124)
Has car/ truck	*Whether a member of the household has a car/ truck*	0 No 1 Yes (V125)
Frequency of reading newspaper or magazine		0 not at all 1 less than once a week 2 at least once a week 3 almost every day (V157)
Frequency of listening to radio		0 not at all 1 less than once a week 2 at least once a week 3 almost every day (V158)
Frequency of watching television		0 not at all 1 less than once a week 2 at least once a week 3 almost every day (V159)

Variable grouping	Question in the survey	Codes
Type of cooking fuel		1 electricity 2 LPG/ natural gas 3 biogas 4 kerosene 6 charcoal 7 firewood/ straw 8 dung reverse coded (V161)
Religion	*What is your religion? (Q117)*	1 Roman Catholic 2 protestant/ other Christian 3 Muslim 4 no religion 6 other, specify (V130) Dummy code
Socio-cultural context (covariate)		
Community practice female circumcision	*In this community, is female circumcision practiced? (Q820)*	1 yes 0 no (S820)
Area of residence	*Defacto area of residence*	Rural urban (V025) Recode urban=1, rural=0